NOAA Technical Memorandum NMFS

PLANNING DOUBLE-TAGGING EXPERIMENTS

Jerry A. Wetherall and Marian Y. Y. Yong

NOAA-TM-NMFS-SWFC-13

June 1981

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southwest Fisheries Center

NOAA Technical Memorandum NMFS

The National Oceanic and Atmospheric Administration (NOAA) was organized in 1970. It has evolved into an agency which establishes national policies and manages and conserves our oceanic coastal, and atmospheric resources. It provides managerial, research, and technical expertise to produce practical services and essential information for the programs concerned with such resources.

The National Marine Fisheries Service (NMFS) provides the United States with an integrated program of management, research, and services concerned about the protection and rational use of living marine resources for their aesthetic, economic, and recreational value. NMFS determines the consequences of the naturally varying environment and human activities on living marine resources. NMFS provides knowledge and services to foster the efficient and judicious use of those resources. NMFS provides for domestic and for international management and conservation of these living resources of the sea.

To carry out its mission, the organization also provides for communication of NMFS information. In addition to its formal publications, NMFS uses the NOAA Technical Memorandum series for informal scientific and technical publications. These documents are specialized reports that require multiple copies when complete formal review and editorial processing are not appropriate or feasible. The management and control of Technical Memorandums has been delegated to the Research Centers, Regional Offices, and corresponding staff offices within NMFS. Therefore, requests for copies of Technical Memorandums should be sent to the author or to the originating office for the material.

NOAA Technical Memorandum NMFS

This TM series is used for documentation and timely communication of preliminary results, imterim reports, or special purpose information; and have not received complete formal review, editorial control, or detailed editing.

PLANNING DOUBLE-TAGGING EXPERIMENTS

Jerry A. Wetherall and Marian Y. Y. Yong

Southwest Fisheries Center Honolulu Laboratory
National Marine Fisheries Service, NOAA
Honolulu, Hawaii 96812

NOAA-TM-NMFS-SWFC-13

June 1981

U.S. DEPARTMENT OF COMMERCE
Malcolm Baldrige, Secretary
National Oceanic and Atmospheric Administration
Dr. John V. Byrne, Administrator
National Marine Fisheries Service
William H. Stevenson, Acting Assistant Administrator for Fisheries

INTRODUCTION

Although a considerable amount of research has been undertaken on the treatment of recovery statistics from double-tagging studies (e.g., Chapman et al. 1965; Bayliff and Mobrand 1972; Kirkwood 1981; Wetherall MS[1]), little attention has been paid to questions which arise in the planning stages of such experiments. Yet without careful planning experimental results may fall short of expectations, and the investment of scarce resources in expensive tagging operations may be for naught.

Our aim in this paper is to develop some guidelines for planning experiments in which a single cohort of double-tagged fish is released prior to a total recapture period which may be partitioned into a sequence of time intervals. Specifically we wish to establish procedures for determining how many fish should be double-tagged, how long the experiment should run, and how the recovery data should be grouped. The answers depend on the objectives of the experiment, on the level of precision desired and on specified or assumed conditions under which the experiment will be conducted. We first develop the statistical framework for making planning decisions and then present a series of tables which assist the experimenter in deciding how many fish to double-tag to achieve either of two different experimental objectives.

---

[1]Wetherall, J. A. 1981. Analysis of double-tagging experiments. Southwest Fisheries Center Honolulu Laboratory, National Marine Fisheries Service, NOAA, Honolulu, HI 96812. [Manuscript submitted to Fish. Bull., U.S., May 1981.]

While it is often recommended that fish be double-tagged simply to increase expected recovery rates (e.g., Hynd 1969; Bayliff 1973), the chief aim of most double-tagging experiments is to estimate rates of tag-shedding, which are used in turn to correct estimates of mortality and other population parameters derived from ordinary single-tagging studies. Less well known is that double-tagging experiments may be conducted to estimate mortality rates directly, in such a way that no corrections for tag shedding are necessary (Wetherall, see footnote 1). Hereafter we distinguish these two purposes as Objective I and Objective II, respectively.

STATISTICAL MODELS AND ASSUMPTIONS

In the case of both Objective I and Objective II we will assume the experimental cohort is double-tagged with tags which have identical and constant shedding probabilities, that the shedding of individual tags occurs independently, that the burden imposed by two tags is the same as it is with one, and that all tagged fish recaptured are recovered and reported. We assume further that instantaneous probabilities of natural mortality and recapture are the same for fish with only a single tag remaining as for those fish with both tags still intact. In the case of Objective II, we make the additional assumption that the mortality rates are constant over the course of the experiment.

Let r_{si} and r_{di} denote the number of recaptures of fish bearing one or two tags, respectively, during the recapture period centered at time τ_i, $i = 1, 2, \ldots, n$. When Objective I is being pursued, we assume recapture statistics are analyzed using the linear regression model of Bayliff and Mobrand (1972):

$$E(y_i) = \ln\rho - L\tau_i$$

where $$y_i = \ln\left\{\frac{2r_{di}}{r_{si} + 2r_{di}}\right\}$$

and $(1-\rho)$ and L are the Type I and Type II shedding rates, respectively. Since our estimate of ρ will invariably be more precise than our estimate of L, we focus our concern on the latter parameter. Specifically, our objective will be to achieve a prescribed coefficient of variation in $\hat{L}$, viz.,

$$C_{\hat{L}} = \frac{\sigma_{\hat{L}}}{L}$$

Let $X = \{x_{ij}\}$ denote the nx2 data matrix such that $x_{i1} = 1$ for all i and $x_{i2} = \tau_i$, and let $V = \{v_{ij}\}$ be the nxn covariance matrix of the residuals. Then the asymptotic covariance matrix of our regression parameter estimates is the 2x2 array

$$U = (X^T V^{-1} X)^{-1} = \{u_{ij}\}$$

where T denotes transpose.

Note that V may be factored into two components, viz.,

$$V = G\left(\frac{1}{N}\right)$$

where the scalar quantity N is the number of double-tagged fish released and the elements of G are functions of L, ρ, the mortality rates and the τ_i.

Hence $$U = \left(\frac{1}{N}\right)(X^T G^{-1} X)^{-1}$$

$$= \left(\frac{1}{N}\right) W \quad , \text{ say.}$$

To achieve the desired $C_{\hat{L}}$, we can manipulate a number of experimental factors which affect the variance of $\hat{L}$, viz.,

$$\sigma^2_{\hat{L}} = u_{22} = \frac{w_{22}}{N} .$$

Most obvious of these is the "sample size," N. Also important are the number of time periods into which recaptures are grouped and the total length of the experiment. These determine the number of data points, n, and, along with prevailing mortality rates and shedding rates, the overall recapture probabilities. However, for any specified combination of the other factors the cohort size N producing the desired coefficient of variation in $\hat{L}$, say $C_{\hat{L}} = \delta$, may be computed as

$$N_\delta = \frac{w_{22}}{L^2\delta^2} .$$

If $\hat{L}$ is normally distributed with mean L and variance $\sigma^2_{\hat{L}}$ then ensuring that $C_{\hat{L}} = \delta$ is equivalent to ensuring that $\hat{L}$ will be within 200δ percent of L with about 95% confidence.

It remains now to specify the elements of G. These depend on the assumed error distribution for the regression model. In the Bayliff-Mobrand model Wetherall (see footnote 1) assumes that r_{si} and r_{di} are binomial random variables conditional on the total number of recaptures in the i^{th} period. In this event the i^{th} diagonal element of G is approximately

$$g_{ii} = \frac{(1 - \kappa_i)(2 - \kappa_i)}{\mu_i \kappa^2_i}$$

where κ_i = probability that a tag is still attached at time τ_i

$$= \rho e^{-L\tau_i}$$

and μ_i = probability that a member of the original tagged cohort is recaptured during the i^{th} period

$$\simeq F\Delta_i \, e^{-(F+M)\tau_i} \quad .$$

Here Δ_i is the length of the i^{th} time interval centered at τ_i, F is the instantaneous fishing mortality rate (assumed constant) and M is the instantaneous natural mortality rate. We further assume that the y_i are mutually independent, so that $g_{ij} = 0$ for $i \neq j$.

When the double-tagging experiment is conducted with Objective II in mind the model given by Wetherall (see footnote 1) is appropriate:

$$E(y_i') = \ln(q\ N) - Z\tau_i$$

where $$y_i' = \ln\left\{\frac{(r_{si} + 2r_{di})^2}{4\Delta_i\ r_{di}}\right\}$$

and $$Z = F + M = qf + M.$$

Here q is the catchability coefficient and f is the constant fishing effort applied during each unit time interval. In this case we seek the value of N which achieves a specified $C_{\hat{Z}} = \sigma_{\hat{Z}}/Z = \delta$. By direct analogy this is

$$N_\delta = \frac{w_{22}'}{Z^2\,\delta^2}$$

where w_{22}' is the second diagonal element of $(X^T\ G'^{-1}\ X)^{-1}$ and G' is the error covariance matrix for the observations y_i'. Under the same distributional assumptions on r_{di} and r_{si}, but with the added condition that $r_{\cdot i} = r_{di} + r_{si}$ is Poisson, we have

$$g'_{ii} \simeq \frac{\kappa_i + 2(1 - \kappa_i)^3}{\mu_i \kappa^2_i (2 - \kappa_i)}$$

and as before we assume $g'_{ij} = 0$ for $i \neq j$.

As in single-tagging experiments, the bigger the recapture sample the higher the precision in the parameter estimates. The number of tagged fish recaptured is the product of the number released, N, and the recapture rate ϕ,

where $$\phi \simeq \sum_{i=1}^{n} \mu_i \kappa_i (2 - \kappa_i) \quad .$$

The experimenter controls the number released, of course, and may also influence the recapture rate by curtailing or extending the total recapture period. There is a trade off here which the experimenter must evaluate; an estimate of L with specified precision may be obtained sooner (shortened recapture period) by making a bigger initial investment (releasing more double-tagged fish). Conversely, if the tagging budget severely restricts the size of the initial release, the experimenter may have to wait out a longer recapture period to achieve the desired results. The effects of these two factors on the coefficient of variation in $\hat{L}$ are illustrated in Figure 1. Here we observe that to double the precision the sample size must be quadrupled, as expected. Similarly, for a given number of fish released, a 4-yr recapture period will almost double the precision in $\hat{L}$ over a 2-yr recapture period.

Another factor which affects the precision of $\hat{L}$ is the number of data points, i.e., the number of grouping intervals into which the total recapture period is divided. Figure 2 shows the coefficient of variation in $\hat{L}$ which is attained with different groupings assuming a particular combination of mortality and shedding rates, an initial release of 5,000

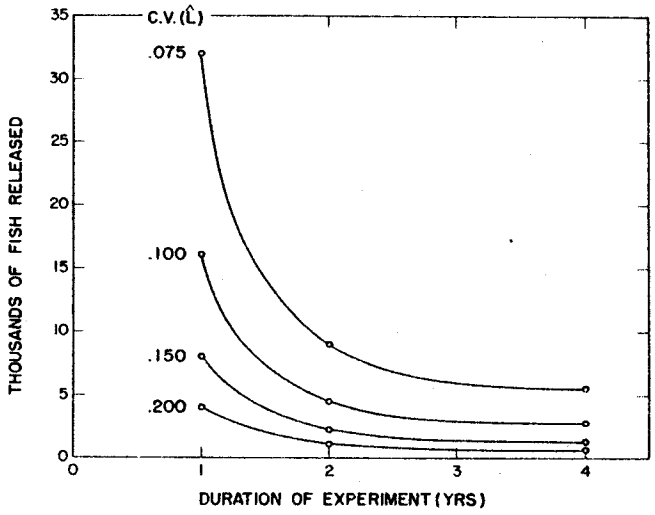

Figure 1.--Effects of duration of experiment and number of double-tagged fish released on the coefficient of variation of $\hat{L}$, C.V.($\hat{L}$). [Assumes $L = 0.3$, $\rho = 0.9$, $F = 0.4$, $M = 0.4$, $\Delta = 0.5$ yr.]

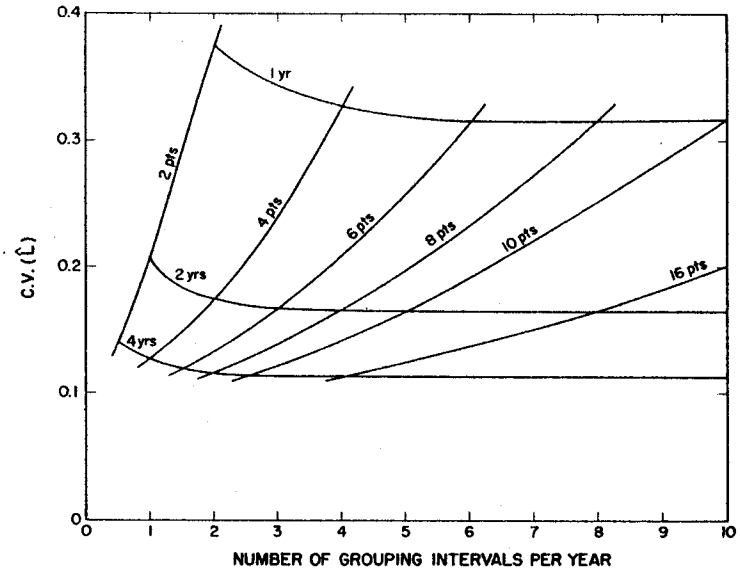

Figure 2.--Effects of grouping interval and duration of experiment on the coefficient of variation of $\hat{L}$, C.V.($\hat{L}$). [Assumes $L = 0.10$, $\rho = 0.9$, $F = 0.4$, $M = 0.4$, $N = 5{,}000$.]

fish and total recapture periods of 1, 2, or 4 yr. At least for this set of conditions there apparently is little to be gained from grouping recapture data into intervals shorter than one quarter of a year. A finer partitioning would provide a slight increase in precision, but this would not be advisable unless a reasonably large number of recaptures could be expected in each interval. Choice of the grouping interval will thus be influenced strongly by the intensity and seasonality of fishing. For example, where recapture effort is concentrated in a relatively brief annual fishing season the data will be clustered in intervals centered at $\tau_1 = 1$ yr, $\tau_2 = 2$ yr, and so on.

DETERMINING SAMPLE SIZE

We turn now to the Appendix Tables and the problem of determining how many double-tagged fish to release in a single cohort to achieve a specified precision in $\hat{L}$ (Appendix A) or $\hat{Z}$ (Appendix B). To enter the tables one must specify

(1) guesses of the parameters L and ρ;

(2) estimates of the instantaneous fishing mortality rate, F, and natural mortality rate, M; these are assumed constant over the duration of the experiment;

(3) the minimum width of recapture intervals (grouping intervals); the table computations assume intervals have equal width.

It is assumed that these are immutable features of the experimental setting. Three key factors then remain, each determined by the experimenter:

(1) The desired precision in $\hat{L}$ or $\hat{Z}$, measured by the appropriate coefficient of variation;

(2) the duration of the experiment;

(3) the number of double-tagged fish released.

Usually the precision and duration will be explicitly stated in the experimental objectives, and the sample size will then be chosen to achieve the desired results. However, sample size and duration may be traded off, as indicated above, and either budgetary or time constraints may force an adjustment of goals with respect to the precision in $\hat{L}$ or $\hat{Z}$.

Appendix A contains the sample size tables for the situation where Objective I is of interest. Each page corresponds to a different combination of L and ρ. We give results for three values of L (0.10, 0.30, 0.70) and four of ρ (1.0, 0.90, 0.70, 0.50). Each page has four tables, corresponding to grouping intervals of 0.10, 0.25, 0.50, and 1.0 yr. Within each table results are given for 25 combinations of F and M, with F ranging from 0.10 to 1.20 and M from 0.10 to 0.80. Finally, each cell contains, from top to bottom, the number of double-tagged fish (thousands) which must be released in a single cohort to achieve a 25% coefficient of variation in $\hat{L}$ when the total recapture period is 1, 2, or 4 yr.

As noted above, if $\hat{L}$ is normally distributed, expecting a coefficient of variation of 25% is equivalent to expecting an estimate of L within 50% of the true value of L with about 95% confidence. If more or less precision is desired, the sample sizes given in Appendix A may be easily adjusted, using the formula

$$N_\delta = 0.0625\ (N_{0.25}/\delta^2)$$

where $N_{0.25}$ = tabled sample size corresponding to a coefficient of variation of 0.25

δ = desired coefficient of variation (e.g., 10% or 0.10)

N_δ = desired sample size.

Although the tabled sample sizes were computed assuming constant F and M and equal grouping intervals, they should provide useful guidelines even for cases with unequal intervals and for the common situations where fishing is periodic. Should one wish to compute the expected number of recaptures for a given set of experimental conditions, the result may be obtained as the product of the sample size from Appendix A and the appropriate expected recapture rate from Appendix C. Note that the recapture rates are independent of the grouping interval.

To illustrate the use of Appendices A and C, suppose that our research plan calls for estimating L with a coefficient of variation of 10% (if we are willing to assume normality of $\hat{L}$, this is equivalent to specifying a 95% chance of estimating L within 20% of its true value). We aren't sure of the natural mortality rate, but guess it is about 0.4, based on experience with another population of the same species. We also guess that F = 0.2 and that the recapture data could be grouped in 3-mo intervals. To integrate with other analyses, we will need our shedding rate estimates in about 2 yr. Finally, other studies suggest to us that Type I shedding is probably about 10%, and that Type II shedding occurs at the rate of about 25% per year; thus, we guess that $\rho = 1.0 - 0.1 = 0.9$ and $L = -\ln(1.0 - 0.25) = 0.30$.

With this information we enter Appendix A, page 17, and find that a release of about 1,120 double-tagged fish will give a 25% coefficient of variation under the specified conditions. Using the formula above, with $\delta = 0.10$ and $N_{0.25} = 1,120$, we compute our final result, $N_{0.10} = 7,000$ fish. According to Appendix C, we would expect to recapture about 7,000 x 0.21 = 1,470 tagged fish over the course of the experiment. At this juncture, we would determine whether our budget would permit us to tag 7,000 fish; if not, precision would have to be reduced, the experiment extended or some other adjustment made.

In practice, it is a good idea to explore a range of values of the various parameters and to check the effects on sample size. For example, in the hypothetical case above if L was guessed to be 0.10 instead of 0.30 we would compute a sample size requirement of 22,560 fish instead of 7,000; if L was 0.70 instead of 0.30 we would require only 5,000 fish. Clearly, the higher the Type II shedding rate, the easier it is to detect and estimate it precisely.

In the case of Objective II, sample sizes may be computed using tables in Appendix B in the same manner as above. Note, however, that results are given for the additional situations when L = 0. Thus they include the combination of parameters associated with no shedding, i.e., $\rho = 1.0$ and $L = 0$. This particular set of tables may be used in planning either double-tagging or ordinary single-tagging experiments designed to estimate Z.

For many sets of circumstances Appendices A and B will show that exceedingly large samples are required to satisfy experimental objectives. Indeed, in many cases it may not be feasible to estimate L or Z with the desired precision, or perhaps even with useful precision. Just how much precision is needed remains an open question. In the case of either

Objective I or Objective II the answer would depend on how $\hat{L}$ or $\hat{Z}$ is ultimately used and on the robustness of the associated decision procedures. However, a coefficient of variation of 25% is probably the minimum level of precision acceptable. Many published estimates of L or Z are far less precise, with coefficients of variation exceeding 100%.

LITERATURE CITED

BAYLIFF, W. H.

1973. Materials and methods for tagging purse seine- and baitboat-caught tunas. [In Engl. and Span.] Inter-Am. Trop. Tuna Comm., Bull. 15:465-503.

BAYLIFF, W. H., and L. M. MOBRAND.

1972. Estimates of rates of shedding of dart tags from yellowfin tuna. [In Engl. and Span.] Inter-Am. Trop. Tuna Comm., Bull. 15:441-462.

CHAPMAN, D. G., B. D. FINK, and E. B. BENNETT.

1965. A method for estimating the rate of shedding of tags from yellowfin tuna. [In Engl. and Span.] Inter-Am. Trop. Tuna Comm., Bull. 10:333-352.

HYND, J. S.

1969. New evidence on southern bluefin stocks and migrations. Aust. Fish. 28(5):26-30.

KIRKWOOD, G. P.

1981. Generalized models for the estimation of rates of tag shedding by southern bluefin tuna (Thunnus maccoyii). J. Cons. Int. Explor. Mer 39:256-260.

APPENDIX A

Sample sizes (thousands of fish) in double-tagging experiments of 1-yr (upper figures), 2-yr (middle figures), or 4-yr duration (lower figures) required for estimating L with a coefficient of variation of 25%. Dashes denote infeasible cases.

$\rho = 1.00$
$L = 0.10$

INTERVAL= 0.10 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	3.88 1.10 0.41	2.05 0.62 0.25	1.15 0.39 0.19	0.72 0.29 0.19	0.60 0.29 0.23
0.20	4.11 1.24 0.50	2.17 0.69 0.31	1.22 0.43 0.23	0.76 0.33 0.22	0.63 0.32 0.26
0.40	4.60 1.54 0.75	2.43 0.86 0.46	1.36 0.53 0.32	0.85 0.40 0.30	0.71 0.39 0.33
0.60	5.15 1.92 1.09	2.73 1.07 0.65	1.52 0.65 0.45	0.95 0.48 0.39	0.79 0.46 0.41
0.80	5.77 2.37 1.53	3.05 1.31 0.90	1.70 0.80 0.60	1.06 0.58 0.50	0.88 0.55 0.50

INTERVAL= 0.25 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	5.12 1.30 0.45	2.71 0.73 0.28	1.52 0.46 0.21	0.96 0.35 0.22	0.80 0.35 0.27
0.20	5.43 1.46 0.56	2.88 0.82 0.35	1.61 0.51 0.26	1.02 0.39 0.26	0.85 0.39 0.31
0.40	6.09 1.83 0.85	3.23 1.02 0.51	1.81 0.63 0.37	1.14 0.48 0.35	0.93 0.48 0.40
0.60	6.84 2.28 1.24	3.62 1.27 0.74	2.03 0.78 0.52	1.28 0.59 0.46	1.07 0.57 0.50
0.80	7.67 2.82 1.75	4.06 1.57 1.03	2.28 0.96 0.70	1.43 0.71 0.59	1.20 0.69 0.62

INTERVAL= 0.50 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	8.35 1.65 0.52	4.43 0.92 0.32	2.50 0.58 0.25	1.59 0.46 0.26	1.36 0.47 0.34
0.20	8.86 1.85 0.65	4.71 1.04 0.40	2.66 0.65 0.30	1.70 0.51 0.31	1.45 0.53 0.39
0.40	10.00 2.32 0.99	5.31 1.30 0.60	3.00 0.82 0.44	1.92 0.64 0.43	1.64 0.65 0.52
0.60	11.29 2.92 1.46	6.00 1.63 0.88	3.39 1.02 0.63	2.17 0.79 0.59	1.86 0.80 0.67
0.80	12.76 3.66 2.11	6.78 2.04 1.25	3.84 1.27 0.87	2.46 0.97 0.77	2.11 0.98 0.85

INTERVAL= 1.00 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 2.72 0.67	-- 1.53 0.42	-- 0.98 0.33	-- 0.81 0.38	-- 0.89 0.53
0.20	-- 3.07 0.84	-- 1.74 0.52	-- 1.11 0.40	-- 0.92 0.46	-- 1.01 0.63
0.40	-- 3.93 1.31	-- 2.22 0.81	-- 1.43 0.61	-- 1.18 0.66	-- 1.30 0.88
0.60	-- 5.04 2.00	-- 2.85 1.23	-- 1.83 0.91	-- 1.52 0.95	-- 1.67 1.22
0.80	-- 6.47 3.00	-- 3.67 1.82	-- 2.36 1.33	-- 1.95 1.33	-- 2.14 1.66

Appendix A.--Continued.

$\rho = 1.00$
$L = 0.30$

INTERVAL= 0.10 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	1.68 0.59 0.30	0.89 0.33 0.18	0.50 0.20 0.13	0.31 0.15 0.12	0.26 0.15 0.13
0.20	1.77 0.66 0.37	0.94 0.37 0.22	0.52 0.22 0.15	0.33 0.17 0.13	0.27 0.16 0.14
0.40	1.98 0.81 0.52	1.05 0.45 0.30	0.59 0.27 0.20	0.36 0.20 0.17	0.30 0.19 0.17
0.60	2.22 1.00 0.71	1.17 0.55 0.41	0.65 0.33 0.27	0.41 0.24 0.21	0.33 0.22 0.21
0.80	2.48 1.21 0.94	1.31 0.67 0.53	0.73 0.40 0.34	0.45 0.28 0.26	0.37 0.26 0.25

INTERVAL= 0.25 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	2.23 0.70 0.34	1.18 0.39 0.21	0.66 0.24 0.15	0.42 0.18 0.14	0.35 0.18 0.15
0.20	2.36 0.78 0.41	1.25 0.44 0.25	0.70 0.27 0.17	0.44 0.20 0.16	0.37 0.20 0.17
0.40	2.65 0.97 0.59	1.40 0.54 0.35	0.79 0.33 0.24	0.49 0.25 0.20	0.41 0.24 0.21
0.60	2.97 1.20 0.82	1.57 0.66 0.47	0.88 0.41 0.31	0.55 0.30 0.26	0.46 0.28 0.26
0.80	3.33 1.47 1.10	1.76 0.81 0.63	0.99 0.49 0.41	0.62 0.36 0.32	0.51 0.33 0.31

INTERVAL= 0.50 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	3.69 0.90 0.40	1.96 0.50 0.24	1.11 0.32 0.18	0.71 0.24 0.17	0.61 0.25 0.20
0.20	3.92 1.01 0.49	2.08 0.56 0.30	1.18 0.35 0.21	0.75 0.27 0.20	0.64 0.28 0.23
0.40	4.43 1.26 0.71	2.36 0.71 0.42	1.33 0.44 0.29	0.85 0.34 0.26	0.73 0.34 0.29
0.60	5.01 1.58 1.00	2.67 0.88 0.59	1.51 0.55 0.40	0.97 0.41 0.34	0.83 0.41 0.37
0.80	5.67 1.97 1.38	3.02 1.09 0.80	1.71 0.67 0.53	1.10 0.51 0.44	0.94 0.50 0.46

INTERVAL= 1.00 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 1.55 0.54	-- 0.88 0.33	-- 0.56 0.25	-- 0.47 0.27	-- 0.51 0.36
0.20	-- 1.75 0.67	-- 0.99 0.41	-- 0.64 0.31	-- 0.53 0.32	-- 0.58 0.42
0.40	-- 2.25 1.01	-- 1.28 0.62	-- 0.82 0.45	-- 0.68 0.45	-- 0.75 0.57
0.60	-- 2.90 1.49	-- 1.64 0.90	-- 1.06 0.65	-- 0.87 0.63	-- 0.96 0.77
0.80	-- 3.73 2.17	-- 2.11 1.29	-- 1.36 0.91	-- 1.12 0.86	-- 1.23 1.03

Appendix A.--Continued.

$\rho = 1.00$
$L = 0.70$

INTERVAL= 0.10 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	1.14 0.56 0.43	0.60 0.31 0.24	0.34 0.18 0.15	0.21 0.13 0.12	0.17 0.12 0.11
0.20	1.21 0.62 0.49	0.64 0.34 0.28	0.35 0.20 0.17	0.22 0.14 0.13	0.18 0.13 0.12
0.40	1.34 0.74 0.62	0.71 0.40 0.35	0.39 0.24 0.22	0.24 0.17 0.16	0.20 0.15 0.14
0.60	1.50 0.88 0.78	0.79 0.48 0.43	0.44 0.28 0.26	0.27 0.19 0.18	0.22 0.17 0.17
0.80	1.66 1.05 0.95	0.88 0.57 0.52	0.49 0.33 0.31	0.30 0.22 0.22	0.24 0.19 0.19

INTERVAL= 0.25 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	1.54 0.68 0.50	0.82 0.38 0.29	0.46 0.23 0.19	0.29 0.16 0.15	0.24 0.15 0.14
0.20	1.64 0.75 0.57	0.87 0.41 0.33	0.48 0.25 0.21	0.30 0.18 0.16	0.25 0.17 0.16
0.40	1.83 0.91 0.75	0.97 0.50 0.42	0.54 0.30 0.26	0.34 0.21 0.20	0.28 0.20 0.19
0.60	2.05 1.10 0.95	1.09 0.60 0.53	0.61 0.36 0.33	0.38 0.25 0.24	0.31 0.23 0.22
0.80	2.30 1.32 1.18	1.21 0.72 0.65	0.68 0.43 0.40	0.42 0.29 0.28	0.35 0.26 0.25

INTERVAL= 0.50 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	2.66 0.91 0.63	1.42 0.51 0.37	0.80 0.31 0.24	0.51 0.24 0.20	0.44 0.23 0.21
0.20	2.83 1.02 0.73	1.51 0.57 0.42	0.85 0.35 0.28	0.55 0.26 0.23	0.47 0.25 0.24
0.40	3.21 1.26 0.98	1.71 0.70 0.56	0.97 0.43 0.36	0.62 0.32 0.29	0.53 0.31 0.29
0.60	3.64 1.55 1.28	1.94 0.86 0.72	1.10 0.52 0.46	0.71 0.38 0.36	0.60 0.37 0.35
0.80	4.13 1.89 1.63	2.20 1.05 0.92	1.24 0.63 0.58	0.80 0.46 0.43	0.69 0.44 0.42

INTERVAL= 1.00 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 1.74 0.98	-- 0.99 0.59	-- 0.64 0.42	-- 0.52 0.40	-- 0.58 0.48
0.20	-- 1.98 1.18	-- 1.12 0.70	-- 0.72 0.49	-- 0.59 0.46	-- 0.65 0.55
0.40	-- 2.54 1.67	-- 1.44 0.99	-- 0.93 0.68	-- 0.76 0.62	-- 0.83 0.73
0.60	-- 3.27 2.32	-- 1.85 1.36	-- 1.19 0.92	-- 0.98 0.83	-- 1.06 0.95
0.80	-- 4.20 3.18	-- 2.38 1.85	-- 1.53 1.24	-- 1.25 1.09	-- 1.36 1.24

Appendix A.--Continued.

$\rho = 0.90$
$L = 0.10$

INTERVAL= 0.10 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	23.58 8.63 1.24	12.40 2.57 0.77	6.88 1.59 0.58	4.24 1.21 0.62	3.49 1.21 0.80
0.20	24.80 5.14 1.53	13.06 2.86 0.94	7.25 1.76 0.70	4.47 1.34 0.74	3.68 1.34 0.92
0.40	27.52 6.35 2.31	14.50 3.53 1.41	8.05 2.18 1.03	4.97 1.64 1.02	4.09 1.63 1.22
0.60	30.56 7.84 3.42	16.10 4.35 2.06	8.94 2.68 1.47	5.52 2.01 1.39	4.54 1.98 1.59
0.80	33.94 9.66 4.94	17.89 5.36 2.94	9.94 3.29 2.05	6.13 2.45 1.84	5.04 2.38 2.01

INTERVAL= 0.25 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	25.08 4.72 1.25	13.22 2.62 0.77	7.34 1.62 0.58	4.54 1.24 0.63	3.76 1.25 0.81
0.20	26.43 5.26 1.55	13.93 2.92 0.95	7.74 1.80 0.71	4.79 1.38 0.75	3.96 1.38 0.95
0.40	29.38 6.49 2.33	15.49 3.61 1.42	8.62 2.23 1.04	5.34 1.69 1.04	4.42 1.69 1.26
0.60	32.67 8.02 3.46	17.23 4.46 2.09	9.59 2.75 1.49	5.95 2.08 1.42	4.92 2.05 1.64
0.80	36.36 9.91 5.01	19.18 5.50 2.99	10.68 3.39 2.09	6.63 2.54 1.89	5.48 2.48 2.09

INTERVAL= 0.50 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	32.27 5.06 1.29	17.04 2.82 0.80	9.51 1.75 0.60	5.96 1.35 0.66	5.00 1.39 0.88
0.20	34.08 5.64 1.59	18.00 3.14 0.98	10.06 1.95 0.74	6.30 1.51 0.79	5.30 1.55 1.02
0.40	38.06 7.01 2.42	20.12 3.91 1.48	11.25 2.43 1.09	7.07 1.88 1.11	5.95 1.91 1.38
0.60	42.55 8.72 3.61	22.51 4.86 2.19	12.61 3.02 1.58	7.94 2.32 1.54	6.70 2.35 1.83
0.80	47.65 10.84 5.27	25.22 6.04 3.16	14.15 3.75 2.22	8.93 2.87 2.07	7.55 2.88 2.37

INTERVAL= 1.00 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 6.81 1.43	-- 3.82 0.89	-- 2.41 0.69	-- 1.95 0.79	-- 2.11 1.13
0.20	-- 7.64 1.78	-- 4.29 1.11	-- 2.71 0.85	-- 2.20 0.97	-- 2.39 1.36
0.40	-- 9.65 2.75	-- 5.43 1.70	-- 3.45 1.29	-- 2.80 1.42	-- 3.06 1.92
0.60	-- 12.23 4.21	-- 6.90 2.59	-- 4.39 1.93	-- 3.59 2.04	-- 3.92 2.68
0.80	-- 15.56 6.34	-- 8.79 3.86	-- 5.61 2.83	-- 4.59 2.88	-- 5.03 3.68

Appendix A.--Continued.

$\rho = 0.90$
$L = 0.30$

INTERVAL= 0.10 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	5.04 1.41 0.61	2.66 0.78 0.37	1.48 0.48 0.26	0.91 0.36 0.25	0.75 0.35 0.29
0.20	5.32 1.56 0.74	2.80 0.87 0.44	1.56 0.53 0.31	0.96 0.40 0.29	0.79 0.39 0.32
0.40	5.92 1.93 1.06	3.12 1.07 0.63	1.74 0.65 0.43	1.07 0.48 0.36	0.88 0.47 0.41
0.80	6.56 2.37 1.48	3.47 1.31 0.87	1.93 0.80 0.58	1.19 0.58 0.49	0.98 0.55 0.50
1.80	7.32 2.89 2.01	3.86 1.60 1.16	2.15 0.97 0.76	1.32 0.70 0.61	1.09 0.65 0.61

INTERVAL= 0.25 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	5.53 1.46 0.62	2.92 0.81 0.36	1.63 0.50 0.27	1.01 0.38 0.26	0.84 0.38 0.30
0.20	5.84 1.63 0.76	3.08 0.90 0.46	1.72 0.56 0.32	1.07 0.42 0.30	0.89 0.41 0.34
0.40	6.51 2.01 1.09	3.44 1.12 0.65	1.92 0.69 0.48	1.19 0.51 0.40	0.99 0.50 0.43
0.80	7.27 2.48 1.53	3.84 1.38 0.90	2.14 0.84 0.61	1.33 0.62 0.51	1.11 0.60 0.54
1.80	8.11 3.04 2.09	4.28 1.68 1.21	2.39 1.03 0.80	1.49 0.75 0.65	1.23 0.71 0.65

INTERVAL= 0.50 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	7.66 1.65 0.67	4.06 0.92 0.41	2.28 0.58 0.30	1.44 0.44 0.29	1.22 0.45 0.35
0.20	8.11 1.85 0.81	4.30 1.03 0.49	2.42 0.64 0.35	1.53 0.50 0.34	1.30 0.50 0.40
0.40	9.12 2.30 1.19	4.84 1.29 0.71	2.72 0.80 0.50	1.73 0.61 0.46	1.47 0.61 0.52
0.80	10.26 2.87 1.69	5.44 1.60 1.00	3.07 0.99 0.68	1.95 0.75 0.60	1.66 0.75 0.66
1.80	11.56 3.56 2.38	6.13 1.98 1.37	3.46 1.22 0.92	2.20 0.92 0.76	1.88 0.91 0.82

INTERVAL= 1.00 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 2.51 0.81	-- 1.42 0.50	-- 0.90 0.36	-- 0.74 0.41	-- 0.82 0.55
0.20	-- 2.83 1.01	-- 1.60 0.62	-- 1.02 0.47	-- 0.84 0.49	-- 0.92 0.64
0.40	-- 3.62 1.53	-- 2.05 0.93	-- 1.31 0.68	-- 1.08 0.70	-- 1.19 0.88
0.80	-- 4.64 2.26	-- 2.63 1.37	-- 1.68 0.98	-- 1.39 0.97	-- 1.52 1.20
1.80	-- 5.95 3.29	-- 3.37 1.97	-- 2.16 1.39	-- 1.78 1.33	-- 1.95 1.60

Appendix A.--Continued.

$\rho = 0.90$
$L = 0.70$

INTERVAL= 0.10 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	2.33 1.60 0.71	1.23 0.55 0.41	0.68 0.33 0.27	0.42 0.24 0.21	0.35 0.22 0.21
0.20	2.46 1.10 0.82	1.29 0.61 0.47	0.72 0.36 0.30	0.44 0.26 0.23	0.36 0.24 0.23
0.40	2.73 1.23 1.07	1.44 0.73 0.60	0.80 0.44 0.38	0.49 0.31 0.28	0.40 0.28 0.27
0.60	3.04 1.60 1.36	1.60 0.87 0.76	0.89 0.52 0.47	0.55 0.36 0.34	0.44 0.32 0.31
0.80	3.37 1.91 1.69	1.78 1.04 0.93	0.99 0.61 0.57	0.60 0.42 0.40	0.49 0.37 0.36

INTERVAL= 0.25 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	2.70 1.68 0.76	1.43 0.60 0.44	0.80 0.36 0.29	0.50 0.26 0.23	0.41 0.25 0.23
0.20	2.86 1.20 0.88	1.51 0.66 0.51	0.84 0.40 0.33	0.53 0.29 0.26	0.44 0.27 0.26
0.40	3.19 1.46 1.15	1.69 0.80 0.65	0.94 0.48 0.42	0.59 0.34 0.32	0.46 0.32 0.30
0.60	3.57 1.77 1.48	1.88 0.97 0.83	1.05 0.58 0.52	0.65 0.41 0.38	0.54 0.37 0.36
0.80	3.98 2.12 1.86	2.10 1.16 1.03	1.17 0.69 0.62	0.73 0.48 0.46	0.60 0.43 0.42

INTERVAL= 0.50 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	4.14 1.34 0.89	2.20 0.74 0.52	1.24 0.46 0.35	0.80 0.35 0.29	0.68 0.34 0.31
0.20	4.41 1.49 1.04	2.34 0.83 0.60	1.32 0.51 0.40	0.85 0.38 0.33	0.72 0.38 0.35
0.40	4.98 1.84 1.39	2.65 1.02 0.80	1.50 0.63 0.52	0.96 0.47 0.42	0.82 0.45 0.42
0.60	5.63 2.26 1.83	2.99 1.25 1.04	1.69 0.77 0.66	1.09 0.56 0.52	0.93 0.54 0.52
0.80	6.37 2.77 2.35	3.39 1.53 1.33	1.92 0.93 0.83	1.23 0.68 0.64	1.05 0.64 0.62

INTERVAL= 1.00 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 2.37 1.31	-- 1.34 0.78	-- 0.86 0.56	-- 0.71 0.53	-- 0.78 0.64
0.20	-- 2.69 1.57	-- 1.52 0.94	-- 0.98 0.66	-- 0.81 0.62	-- 0.88 0.74
0.40	-- 3.46 2.22	-- 1.96 1.32	-- 1.26 0.91	-- 1.04 0.83	-- 1.13 0.98
0.60	-- 4.44 3.10	-- 2.52 1.82	-- 1.61 1.24	-- 1.33 1.11	-- 1.45 1.29
0.80	-- 5.70 4.25	-- 3.23 2.48	-- 2.07 1.67	-- 1.70 1.47	-- 1.85 1.68

Appendix A.--Continued.

$\rho = 0.70$
$L = 0.10$

INTERVAL= 0.10 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	107.62 18.28 4.12	56.64 10.14 2.54	31.39 6.25 1.92	19.31 4.75 2.11	15.86 4.79 2.63
0.20	113.28 20.28 5.08	59.62 11.26 3.13	33.05 6.94 2.38	20.34 5.27 2.53	16.72 5.30 3.32
0.40	125.65 25.00 7.69	66.10 13.88 4.71	36.66 8.56 3.49	22.56 6.48 3.60	18.56 6.48 4.49
0.60	139.22 30.82 11.49	73.32 17.11 6.38	40.68 10.54 5.07	25.07 7.95 4.98	20.62 7.90 5.93
0.80	154.47 38.60 16.87	81.36 21.08 10.14	45.16 12.97 7.19	27.85 9.73 6.73	22.90 9.57 7.67

INTERVAL= 0.25 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	113.67 18.66 4.14	59.95 10.30 2.55	33.25 6.35 1.93	20.51 4.84 2.13	16.90 4.90 2.87
0.20	119.89 20.66 5.11	63.12 11.44 3.15	35.03 7.06 2.37	21.62 5.38 2.56	17.83 5.43 3.37
0.40	133.00 25.41 7.74	70.06 14.11 4.74	38.91 8.71 3.62	24.04 6.63 3.64	19.85 6.66 4.57
0.60	147.66 31.36 11.58	77.81 17.42 7.04	43.24 10.75 5.12	26.75 8.15 5.06	22.10 8.13 6.06
0.80	164.05 38.72 17.03	86.48 21.50 10.24	48.08 13.25 7.28	29.77 9.99 6.86	24.61 9.89 7.68

INTERVAL= 0.50 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	143.31 19.60 4.21	75.55 10.89 2.60	42.04 6.74 1.98	26.15 5.18 2.20	21.81 5.32 3.01
0.20	151.09 21.79 5.20	79.68 12.12 3.21	44.37 7.50 2.43	27.64 5.77 2.66	23.09 5.92 3.56
0.40	168.15 26.96 7.91	88.74 15.01 4.86	49.49 9.31 3.63	30.92 7.16 3.81	25.89 7.32 4.88
0.60	187.42 33.42 11.89	98.99 18.61 7.25	55.29 11.55 5.31	34.64 8.88 5.34	29.07 9.03 6.56
0.80	209.20 41.47 17.60	110.57 23.10 10.62	61.84 14.33 7.62	38.84 10.98 7.32	32.68 11.11 8.64

INTERVAL= 1.00 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 25.09 4.51	-- 14.01 2.80	-- 8.78 2.16	-- 6.99 2.50	-- 7.53 3.65
0.20	-- 28.03 5.60	-- 15.67 3.48	-- 9.84 2.68	-- 7.87 3.06	-- 8.50 4.40
0.40	-- 35.11 8.64	-- 19.69 5.35	-- 12.42 4.08	-- 10.01 4.53	-- 10.85 6.29
0.60	-- 44.22 13.23	-- 24.85 8.15	-- 15.74 6.13	-- 12.75 6.60	-- 13.88 8.84
0.80	-- 55.92 20.04	-- 31.48 12.26	-- 20.01 9.07	-- 16.28 9.43	-- 17.76 12.26

Appendix A.--Continued.

$\rho = 0.70$
$L = 0.30$

INTERVAL= 0.10 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	17.98 4.19 1.55	9.47 2.33 0.95	5.26 1.44 0.69	3.25 1.08 0.68	2.67 1.07 0.81
0.20	18.95 4.66 1.89	9.98 2.59 1.15	5.54 1.59 0.83	3.42 1.20 0.80	2.82 1.18 0.93
0.40	21.04 5.74 2.76	11.09 3.19 1.65	6.16 1.96 1.16	3.80 1.46 1.06	3.13 1.43 1.18
0.60	23.38 7.07 3.93	12.32 3.92 2.32	6.84 2.40 1.59	4.22 1.78 1.39	3.47 1.71 1.49
0.80	25.97 8.67 5.46	13.69 4.80 3.18	7.60 2.93 2.13	4.69 2.14 1.78	3.85 2.05 1.84

INTERVAL= 0.25 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	19.19 4.28 1.57	10.12 2.38 0.96	5.63 1.47 0.70	3.49 1.12 0.70	2.88 1.11 0.84
0.20	20.24 4.76 1.91	10.67 2.65 1.16	5.94 1.63 0.84	3.68 1.24 0.81	3.05 1.23 0.98
0.40	22.51 5.89 2.80	11.87 3.27 1.68	6.61 2.01 1.18	4.10 1.51 1.09	3.39 1.49 1.23
0.60	25.08 7.26 4.00	13.22 4.03 2.37	7.36 2.47 1.63	4.57 1.84 1.43	3.78 1.79 1.55
0.80	27.90 8.93 5.57	14.72 4.95 3.25	8.20 3.03 2.18	5.09 2.23 1.84	4.21 2.15 1.92

INTERVAL= 0.50 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	24.84 4.63 1.63	13.13 2.58 0.99	7.35 1.60 0.73	4.62 1.24 0.74	3.89 1.26 0.92
0.20	26.26 5.16 1.99	13.89 2.88 1.21	7.78 1.79 0.88	4.89 1.38 0.88	4.12 1.40 1.06
0.40	29.39 6.42 2.93	15.55 3.58 1.77	8.72 2.22 1.26	5.50 1.70 1.19	4.64 1.72 1.38
0.60	32.93 7.97 4.23	17.44 4.44 2.52	9.79 2.75 1.75	6.19 2.10 1.38	5.23 2.10 1.77
0.80	36.95 9.89 5.95	19.57 5.50 3.50	11.00 3.40 2.38	6.97 2.57 2.07	5.90 2.56 2.24

INTERVAL= 1.00 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 6.37 1.85	-- 3.59 1.15	-- 2.28 0.87	-- 1.85 0.95	-- 2.02 1.28
0.20	-- 7.17 2.29	-- 4.04 1.41	-- 2.57 1.06	-- 2.10 1.14	-- 2.29 1.52
0.40	-- 9.12 3.48	-- 5.14 2.13	-- 3.28 1.57	-- 2.68 1.62	-- 2.94 2.09
0.60	-- 11.62 5.18	-- 6.56 3.14	-- 4.19 2.28	-- 3.44 2.27	-- 3.76 2.85
0.80	-- 14.84 7.58	-- 8.39 4.55	-- 5.37 3.24	-- 4.41 3.14	-- 4.82 3.84

Appendix A.--Continued.

$\rho = 0.70$
L = 0.70

INTERVAL= 0.10 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	6.60 2.44 1.62	3.48 1.35 0.94	1.93 0.82 0.62	1.19 0.60 0.51	0.98 0.56 0.51
0.20	6.95 2.69 1.88	3.67 1.49 1.08	2.04 0.90 0.71	1.26 0.65 0.57	1.03 0.61 0.57
0.40	7.73 3.28 2.49	4.08 1.80 1.42	2.26 1.09 0.91	1.39 0.78 0.70	1.14 0.72 0.68
0.60	8.59 3.96 3.21	4.53 2.17 1.81	2.51 1.30 1.14	1.55 0.92 0.85	1.26 0.84 0.80
0.80	9.54 4.76 4.07	5.03 2.61 2.27	2.79 1.55 1.40	1.71 1.08 1.02	1.40 0.97 0.94

INTERVAL= 0.25 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	7.22 2.54 1.67	3.81 1.41 0.97	2.13 0.86 0.65	1.32 0.63 0.53	1.10 0.60 0.55
0.20	7.63 2.82 1.94	4.03 1.56 1.12	2.25 0.95 0.74	1.40 0.69 0.60	1.16 0.66 0.61
0.40	8.51 3.44 2.58	4.49 1.90 1.48	2.51 1.15 0.95	1.56 0.83 0.74	1.29 0.78 0.73
0.60	9.49 4.18 3.36	5.01 2.30 1.90	2.79 1.38 1.20	1.73 0.99 0.91	1.43 0.91 0.88
0.80	10.58 5.05 4.28	5.59 2.77 2.40	3.11 1.66 1.49	1.93 1.17 1.10	1.59 1.07 1.03

INTERVAL= 0.50 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	10.05 2.92 1.84	5.33 1.63 1.08	3.00 1.00 0.73	1.91 0.76 0.63	1.63 0.75 0.67
0.20	10.66 3.25 2.16	5.66 1.81 1.26	3.19 1.12 0.84	2.03 0.84 0.71	1.73 0.83 0.75
0.40	12.01 4.02 2.91	6.38 2.23 1.68	3.60 1.37 1.10	2.29 1.02 0.90	1.95 1.00 0.93
0.60	13.54 4.95 3.86	7.19 2.74 2.20	4.06 1.68 1.42	2.59 1.24 1.12	2.21 1.20 1.13
0.80	15.28 6.07 5.01	8.12 3.36 2.83	4.58 2.05 1.80	2.93 1.50 1.39	2.50 1.44 1.38

INTERVAL= 1.00 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 4.70 2.48	-- 2.66 1.49	-- 1.71 1.06	-- 1.40 1.02	-- 1.54 1.24
0.20	-- 5.32 2.98	-- 3.01 1.78	-- 1.93 1.26	-- 1.59 1.19	-- 1.74 1.44
0.40	-- 6.82 4.24	-- 3.86 2.51	-- 2.48 1.74	-- 2.04 1.61	-- 2.23 1.91
0.60	-- 8.75 5.93	-- 4.96 3.48	-- 3.18 2.38	-- 2.61 2.16	-- 2.85 2.51
0.80	-- 11.23 8.17	-- 6.36 4.77	-- 4.08 3.22	-- 3.34 2.86	-- 3.64 3.28

Appendix A.--Continued.

$\rho = 0.50$
L = 0.10

INTERVAL= 0.10 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	376.02 61.01 12.68	199.42 33.83 7.82	110.47 20.83 5.92	67.91 15.82 6.57	55.76 15.97 8.96
0.20	398.84 67.66 15.64	209.89 37.83 9.63	116.30 23.12 7.27	71.53 17.56 7.92	58.75 17.70 10.56
0.40	441.87 83.31 23.70	232.60 46.24 14.54	128.96 28.50 10.83	79.39 21.61 11.34	65.24 21.67 14.41
0.60	485.82 102.67 35.57	257.91 57.00 21.67	143.06 35.12 15.85	88.13 26.55 15.84	72.46 26.65 19.22
0.80	543.27 126.56 52.54	286.12 70.24 31.69	158.77 43.23 22.68	97.87 32.51 21.62	80.47 32.13 25.09

INTERVAL= 0.25 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	403.63 61.68 12.74	210.86 34.32 7.85	116.89 21.15 5.96	72.02 16.10 6.62	59.32 16.31 9.07
0.20	421.72 68.65 15.71	222.00 38.09 9.68	123.12 23.49 7.31	75.91 17.88 7.99	62.56 18.09 10.71
0.40	467.57 84.59 23.83	246.24 46.67 14.63	136.67 28.98 10.91	84.38 22.05 11.46	69.61 22.21 14.65
0.60	516.82 104.36 35.80	273.34 57.97 21.82	151.82 35.77 15.99	93.84 27.14 16.06	77.48 27.17 19.61
0.80	576.12 128.80 52.97	303.63 71.54 31.98	168.75 44.10 22.93	104.41 33.31 21.98	86.27 33.12 25.69

INTERVAL= 0.50 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	502.53 65.19 12.93	264.77 36.20 7.98	147.18 22.36 6.07	91.38 17.17 6.81	76.09 17.60 9.48
0.20	529.54 72.40 15.96	279.12 40.22 9.85	155.28 24.88 7.47	96.55 19.12 8.25	80.51 19.59 11.24
0.40	588.72 89.45 24.28	310.55 49.76 14.94	173.03 30.83 11.20	107.91 23.71 11.92	90.22 24.25 15.54
0.60	655.53 110.76 36.64	346.06 61.66 22.39	193.11 38.24 16.51	120.76 29.39 16.66	101.22 29.95 21.04
0.80	731.04 137.32 54.51	386.21 76.47 33.01	215.82 47.43 23.85	135.32 36.36 23.31	113.68 36.89 27.93

INTERVAL= 1.00 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 82.56 13.74	-- 46.04 8.52	-- 28.75 6.56	-- 22.78 7.64	-- 24.44 11.26
0.20	-- 92.07 17.04	-- 51.42 10.57	-- 32.20 8.13	-- 25.62 9.37	-- 27.58 13.58
0.40	-- 115.01 26.24	-- 64.40 16.26	-- 40.53 12.42	-- 32.51 13.93	-- 35.18 19.53
0.60	-- 144.42 40.24	-- 81.07 24.83	-- 51.24 18.74	-- 41.37 20.37	-- 44.94 27.63
0.80	-- 182.21 61.12	-- 102.49 37.48	-- 65.02 27.86	-- 52.77 29.29	-- 57.49 38.50

Appendix A.--Continued.

ρ = 0.50
L = 0.30

INTERVAL= 0.10 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	57.46 12.20 4.09	30.26 6.77 2.50	16.79 4.18 1.84	10.35 3.16 1.86	8.51 3.15 2.27
0.20	60.52 13.55 5.00	31.87 7.52 3.04	17.69 4.64 2.21	10.91 3.50 2.18	8.97 3.47 2.61
0.40	67.16 16.71 7.36	35.38 9.27 4.43	19.64 5.70 3.15	12.11 4.28 2.95	9.96 4.21 3.37
0.60	74.85 20.58 10.59	39.28 11.41 6.29	21.81 7.00 4.37	13.45 5.21 3.91	11.06 5.08 4.28
0.80	82.79 25.28 14.88	43.62 14.00 8.73	24.23 8.58 5.91	14.94 6.32 5.06	12.28 6.09 5.35

INTERVAL= 0.25 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	60.99 12.42 4.12	32.14 6.90 2.52	17.86 4.26 1.86	11.05 3.24 1.89	9.13 3.24 2.32
0.20	64.28 13.80 5.04	33.88 7.67 3.07	18.83 4.73 2.24	11.66 3.59 2.22	9.63 3.58 2.67
0.40	71.43 17.04 7.43	37.66 9.47 4.48	20.94 5.83 3.19	12.97 4.40 3.01	10.73 4.36 3.47
0.60	79.43 21.03 10.72	41.89 11.67 6.38	23.31 7.18 4.44	14.45 5.37 4.00	11.95 5.27 4.42
0.80	88.37 25.69 15.10	46.61 14.35 8.88	25.94 8.80 6.03	16.09 6.53 5.20	13.31 6.35 5.55

INTERVAL= 0.50 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	77.61 13.25 4.23	40.99 7.38 2.59	22.89 4.58 1.92	14.33 3.53 1.99	12.03 3.60 2.50
0.20	81.97 14.75 5.19	43.31 8.22 3.17	24.20 5.10 2.33	15.17 3.93 2.35	12.75 4.00 2.90
0.40	91.55 18.32 7.70	48.40 10.21 4.65	27.08 6.33 3.34	17.02 4.86 3.23	14.33 4.92 3.82
0.60	102.38 22.74 11.19	54.16 12.67 6.69	30.35 7.85 4.70	19.12 5.99 4.34	16.13 6.03 4.95
0.80	114.65 28.21 16.91	60.69 15.70 9.40	34.05 9.71 6.46	21.50 7.37 5.73	18.17 7.36 6.32

INTERVAL= 1.00 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 17.57 4.69	-- 9.87 2.90	-- 6.24 2.20	-- 5.05 2.43	-- 5.49 3.32
0.20	-- 19.73 5.81	-- 11.09 3.56	-- 7.03 2.70	-- 5.70 2.92	-- 6.21 3.94
0.40	-- 24.97 8.82	-- 14.07 5.41	-- 8.95 4.01	-- 7.29 4.19	-- 7.96 5.47
0.60	-- 31.72 13.20	-- 17.89 8.02	-- 11.41 5.85	-- 9.32 5.91	-- 10.19 7.49
0.80	-- 40.40 19.42	-- 22.81 11.70	-- 14.57 8.38	-- 11.93 8.20	-- 13.05 10.15

Appendix A.--Continued.

$\rho = 0.50$
$L = 0.70$

INTERVAL= 0.10 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	18.71 6.27 3.94	9.86 3.47 2.30	5.48 2.12 1.54	3.38 1.55 1.28	2.78 1.48 1.33
0.20	19.73 6.94 4.60	10.40 3.83 2.67	5.78 2.33 1.76	3.56 1.70 1.44	2.93 1.61 1.47
0.40	21.92 8.46 6.15	11.55 4.67 3.52	6.42 2.82 2.28	3.96 2.03 1.80	3.24 1.91 1.78
0.60	24.36 10.27 8.03	12.84 5.65 4.55	7.13 3.40 2.89	4.39 2.42 2.21	3.60 2.24 2.13
0.80	27.06 12.41 10.28	14.26 6.80 5.77	7.91 4.07 3.60	4.87 2.86 2.67	3.98 2.62 2.52

INTERVAL= 0.25 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	20.16 6.47 4.02	10.64 3.58 2.35	5.93 2.19 1.58	3.68 1.62 1.33	3.05 1.56 1.39
0.20	21.28 7.16 4.70	11.23 3.96 2.73	6.28 2.42 1.81	3.89 1.78 1.50	3.22 1.70 1.55
0.40	23.71 8.77 6.31	12.51 4.84 3.63	6.97 2.94 2.36	4.33 2.14 1.88	3.58 2.03 1.88
0.60	26.42 10.66 8.29	13.95 5.89 4.71	7.77 3.56 3.00	4.82 2.56 2.32	3.99 2.40 2.27
0.80	29.45 12.95 10.66	15.54 7.12 6.00	8.66 4.28 3.76	5.37 3.04 2.83	4.44 2.82 2.70

INTERVAL= 0.50 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	26.89 7.19 4.31	14.25 4.60 2.84	8.01 2.48 1.73	5.07 1.88 1.51	4.30 1.86 1.63
0.20	28.50 8.01 5.07	15.10 4.45 2.97	8.49 2.75 2.00	5.39 2.08 1.71	4.57 2.05 1.83
0.40	32.03 9.91 6.91	16.99 5.50 4.00	9.56 3.39 2.64	6.08 2.53 2.18	5.16 2.49 2.28
0.60	36.05 12.21 9.21	19.13 6.77 5.28	10.78 4.15 3.42	6.86 3.08 2.75	5.83 3.00 2.80
0.80	40.60 15.01 12.04	21.55 8.30 6.84	12.15 5.07 4.37	7.74 3.73 3.42	6.59 3.59 3.42

INTERVAL= 1.00 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 10.86 5.51	-- 6.14 3.21	-- 3.93 2.36	-- 3.23 2.29	-- 3.54 2.81
0.20	-- 12.29 6.63	-- 6.95 3.97	-- 4.45 2.80	-- 3.66 2.68	-- 4.00 3.25
0.40	-- 15.73 9.45	-- 8.90 5.61	-- 5.70 3.90	-- 4.69 3.63	-- 5.12 4.32
0.60	-- 20.16 13.26	-- 11.41 7.81	-- 7.31 5.36	-- 6.00 4.88	-- 6.55 5.71
0.80	-- 25.84 18.33	-- 14.63 10.72	-- 9.37 7.27	-- 7.68 6.49	-- 8.37 7.48

APPENDIX B

Sample sizes (thousands of fish) in double-tagging experiments of 1-yr (upper figures), 2-yr (middle figures), or 4-yr duration (lower figures) required for estimating Z with a coefficient of variation of 25%. Dashes denote infeasible cases.

$\rho = 1.00$
$L = 0.00$

INTERVAL= 0.10 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	53.60 7.36 1.13	12.53 1.91 0.31	2.49 0.40 0.08	0.47 0.09 0.03	0.18 0.04 0.02
0.20	25.06 3.62 0.61	7.41 1.13 0.21	1.82 0.31 0.07	0.40 0.08 0.03	0.17 0.04 0.02
0.40	9.98 1.60 0.33	3.65 0.61 0.14	1.14 0.21 0.06	0.31 0.07 0.03	0.14 0.04 0.02
0.60	5.64 1.00 0.26	2.27 0.43 0.12	0.81 0.17 0.06	0.25 0.06 0.03	0.13 0.04 0.02
0.80	3.78 0.75 0.24	1.61 0.34 0.12	0.62 0.14 0.06	0.21 0.06 0.03	0.11 0.04 0.03

INTERVAL= 0.25 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	56.61 7.45 1.13	13.23 1.83 0.31	2.64 0.40 0.08	0.50 0.09 0.03	0.20 0.05 0.02
0.20	26.46 3.67 0.62	7.83 1.14 0.21	1.93 0.31 0.07	0.43 0.08 0.03	0.18 0.04 0.02
0.40	10.55 1.62 0.34	3.85 0.62 0.14	1.20 0.22 0.06	0.33 0.07 0.03	0.15 0.04 0.02
0.60	5.96 1.02 0.26	2.40 0.43 0.12	0.85 0.17 0.06	0.27 0.07 0.03	0.13 0.04 0.02
0.80	4.00 0.76 0.24	1.71 0.34 0.12	0.66 0.15 0.06	0.23 0.06 0.03	0.12 0.04 0.03

INTERVAL= 0.50 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	70.79 7.83 1.14	16.55 1.93 0.31	3.30 0.43 0.08	0.63 0.10 0.03	0.25 0.05 0.02
0.20	33.11 3.85 0.62	9.80 1.20 0.22	2.42 0.33 0.07	0.54 0.09 0.03	0.23 0.05 0.02
0.40	13.22 1.71 0.34	4.83 0.66 0.15	1.51 0.23 0.06	0.42 0.08 0.03	0.19 0.04 0.02
0.60	7.49 1.37 0.26	3.02 0.46 0.13	1.08 0.18 0.06	0.34 0.07 0.03	0.17 0.04 0.03
0.80	5.04 0.80 0.24	2.15 0.36 0.12	0.83 0.15 0.06	0.29 0.07 0.04	0.16 0.04 0.03

INTERVAL= 1.00 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 9.80 1.20	-- 2.42 0.33	-- 0.54 0.09	-- 0.13 0.03	-- 0.06 0.02
0.20	-- 4.83 0.66	-- 1.51 0.23	-- 0.42 0.08	-- 0.12 0.03	-- 0.06 0.02
0.40	-- 2.15 0.36	-- 0.83 0.15	-- 0.29 0.07	-- 0.10 0.03	-- 0.06 0.03
0.60	-- 1.37 0.28	-- 0.58 0.13	-- 0.23 0.07	-- 0.09 0.04	-- 0.06 0.03
0.80	-- 1.04 0.26	-- 0.47 0.13	-- 0.21 0.07	-- 0.09 0.04	-- 0.06 0.04

Appendix B.--Continued.

$\rho = 1.00$
$L = 0.10$

INTERVAL= 0.10 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	53.84 7.50 1.23	12.58 1.84 0.33	2.51 0.41 0.09	0.47 0.09 0.03	0.19 0.05 0.02
0.20	25.16 3.69 0.67	7.44 1.15 0.23	1.83 0.31 0.08	0.40 0.08 0.03	0.17 0.04 0.02
0.40	10.03 1.63 0.36	3.66 0.63 0.16	1.14 0.22 0.07	0.31 0.07 0.03	0.14 0.04 0.02
0.60	5.66 1.02 0.28	2.28 0.43 0.13	0.81 0.17 0.06	0.25 0.07 0.03	0.13 0.04 0.03
0.80	3.80 0.76 0.25	1.62 0.34 0.13	0.62 0.15 0.06	0.22 0.06 0.04	0.11 0.04 0.03

INTERVAL= 0.25 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	56.85 7.60 1.23	13.29 1.87 0.34	2.65 0.41 0.09	0.50 0.10 0.03	0.20 0.05 0.02
0.20	26.58 3.74 0.67	7.86 1.16 0.23	1.93 0.32 0.08	0.43 0.09 0.03	0.18 0.04 0.02
0.40	10.59 1.65 0.37	3.87 0.64 0.16	1.21 0.22 0.07	0.33 0.07 0.03	0.15 0.04 0.02
0.60	5.99 1.04 0.28	2.41 0.44 0.13	0.86 0.17 0.06	0.27 0.07 0.03	0.13 0.04 0.03
0.80	4.02 0.77 0.26	1.71 0.35 0.13	0.66 0.15 0.06	0.23 0.06 0.04	0.12 0.04 0.03

INTERVAL= 0.50 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	71.04 7.97 1.24	16.61 1.96 0.34	3.32 0.43 0.09	0.63 0.10 0.03	0.25 0.05 0.02
0.20	33.23 3.93 0.68	9.84 1.22 0.23	2.43 0.33 0.08	0.54 0.09 0.03	0.23 0.05 0.02
0.40	13.27 1.74 0.37	4.85 0.67 0.16	1.52 0.23 0.07	0.42 0.08 0.03	0.20 0.04 0.02
0.60	7.52 1.09 0.29	3.03 0.46 0.13	1.08 0.18 0.06	0.34 0.07 0.03	0.17 0.04 0.03
0.80	5.06 0.82 0.26	2.16 0.37 0.13	0.84 0.16 0.07	0.29 0.07 0.04	0.16 0.04 0.03

INTERVAL= 1.00 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 9.96 1.30	-- 2.46 0.36	-- 0.55 0.10	-- 0.13 0.03	-- 0.07 0.02
0.20	-- 4.91 0.71	-- 1.54 0.25	-- 0.42 0.08	-- 0.12 0.03	-- 0.06 0.03
0.40	-- 2.19 0.39	-- 0.95 0.17	-- 0.30 0.07	-- 0.10 0.04	-- 0.06 0.03
0.60	-- 1.39 0.31	-- 0.59 0.14	-- 0.24 0.07	-- 0.10 0.04	-- 0.06 0.03
0.80	-- 1.05 0.28	-- 0.48 0.14	-- 0.21 0.07	-- 0.09 0.04	-- 0.06 0.04

Appendix B.--Continued.

$\rho = 1.00$
$L = 0.30$

INTERVAL= 0.10 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	56.07 9.03 2.45	13.11 2.22 0.66	2.61 0.49 0.18	0.49 0.11 0.06	0.19 0.05 0.03
0.20	26.21 4.45 1.33	7.76 1.38 0.45	1.91 0.38 0.15	0.42 0.10 0.05	0.18 0.05 0.03
0.40	10.45 1.97 0.71	3.82 0.76 0.30	1.19 0.26 0.12	0.32 0.09 0.05	0.15 0.05 0.03
0.60	5.90 1.23 0.52	2.38 0.52 0.24	0.84 0.20 0.11	0.26 0.08 0.05	0.13 0.05 0.04
0.80	3.96 0.92 0.45	1.69 0.41 0.22	0.65 0.17 0.10	0.22 0.07 0.05	0.12 0.05 0.04

INTERVAL= 0.25 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	59.10 9.13 2.46	13.82 2.25 0.67	2.75 0.50 0.18	0.52 0.12 0.06	0.21 0.06 0.03
0.20	27.64 4.50 1.33	8.18 1.40 0.46	2.01 0.38 0.15	0.45 0.10 0.05	0.19 0.05 0.03
0.40	11.02 1.99 0.71	4.03 0.77 0.30	1.26 0.26 0.12	0.34 0.09 0.05	0.16 0.05 0.03
0.60	6.23 1.25 0.53	2.51 0.53 0.24	0.89 0.21 0.11	0.28 0.08 0.05	0.14 0.05 0.04
0.80	4.18 0.93 0.46	1.78 0.42 0.22	0.69 0.18 0.10	0.24 0.07 0.05	0.13 0.05 0.04

INTERVAL= 0.50 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	73.38 9.53 2.49	17.17 2.35 0.67	3.43 0.52 0.18	0.65 0.12 0.06	0.26 0.06 0.04
0.20	34.34 4.70 1.35	10.17 1.47 0.46	2.51 0.40 0.15	0.56 0.11 0.06	0.24 0.06 0.04
0.40	13.72 2.08 0.72	5.02 0.80 0.30	1.57 0.28 0.12	0.43 0.09 0.05	0.20 0.05 0.04
0.60	7.78 1.31 0.54	3.14 0.56 0.25	1.12 0.22 0.11	0.36 0.09 0.05	0.18 0.05 0.04
0.80	5.24 0.98 0.47	2.24 0.44 0.22	0.87 0.19 0.11	0.30 0.08 0.06	0.16 0.05 0.04

INTERVAL= 1.00 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 11.57 2.59	-- 2.86 0.71	-- 0.64 0.19	-- 0.15 0.06	-- 0.08 0.04
0.20	-- 5.73 1.41	-- 1.80 0.49	-- 0.50 0.16	-- 0.14 0.06	-- 0.08 0.04
0.40	-- 2.57 0.76	-- 1.00 0.32	-- 0.35 0.13	-- 0.12 0.06	-- 0.07 0.05
0.60	-- 1.64 0.58	-- 0.70 0.27	-- 0.28 0.13	-- 0.12 0.06	-- 0.07 0.05
0.80	-- 1.25 0.52	-- 0.57 0.25	-- 0.25 0.13	-- 0.11 0.07	-- 0.08 0.06

Appendix B.--Continued.

$\rho = 1.00$
$L = 0.70$

INTERVAL= 0.10 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	70.96 20.07 12.33	16.59 4.93 3.19	3.31 1.08 0.77	0.63 0.24 0.20	0.25 0.11 0.10
0.20	33.19 9.85 6.39	9.82 3.06 2.08	2.42 0.83 0.61	0.53 0.22 0.18	0.22 0.10 0.09
0.40	13.24 4.32 3.07	4.84 1.65 1.22	1.51 0.56 0.44	0.41 0.18 0.16	0.19 0.10 0.09
0.60	7.48 2.67 2.05	3.02 1.13 0.89	1.07 0.43 0.36	0.33 0.16 0.14	0.17 0.09 0.08
0.80	5.02 1.95 1.59	2.14 0.87 0.72	0.82 0.36 0.31	0.28 0.14 0.13	0.15 0.09 0.08

INTERVAL= 0.25 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	74.14 20.27 12.40	17.35 4.98 3.21	3.46 1.09 0.77	0.66 0.25 0.20	0.26 0.11 0.10
0.20	34.70 9.96 6.43	10.28 3.09 2.09	2.53 0.84 0.62	0.56 0.22 0.18	0.23 0.11 0.10
0.40	13.85 4.37 3.09	5.07 1.67 1.23	1.58 0.57 0.45	0.43 0.18 0.16	0.20 0.10 0.09
0.60	7.84 2.71 2.07	3.16 1.14 0.90	1.12 0.44 0.37	0.35 0.16 0.14	0.18 0.09 0.09
0.80	5.27 1.98 1.61	2.25 0.88 0.73	0.87 0.37 0.32	0.30 0.15 0.14	0.16 0.09 0.08

INTERVAL= 0.50 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	88.85 21.05 12.65	20.83 5.18 3.29	4.18 1.14 0.80	0.80 0.26 0.21	0.32 0.12 0.11
0.20	41.66 10.37 6.58	12.36 3.23 2.15	3.06 0.88 0.64	0.69 0.23 0.19	0.29 0.12 0.10
0.40	16.71 4.58 3.19	6.13 1.76 1.27	1.92 0.60 0.47	0.53 0.20 0.17	0.25 0.11 0.10
0.60	9.51 2.86 2.15	3.85 1.21 0.94	1.38 0.47 0.39	0.44 0.18 0.16	0.22 0.10 0.10
0.80	6.43 2.11 1.69	2.75 0.94 0.77	1.07 0.40 0.34	0.38 0.16 0.15	0.20 0.10 0.09

INTERVAL= 1.00 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 26.15 14.15	-- 6.54 3.74	-- 1.49 0.94	-- 0.37 0.27	-- 0.19 0.16
0.20	-- 13.08 7.48	-- 4.14 2.49	-- 1.17 0.77	-- 0.34 0.26	-- 0.19 0.15
0.40	-- 5.97 3.77	-- 2.33 1.54	-- 0.83 0.59	-- 0.30 0.24	-- 0.18 0.16
0.60	-- 3.87 2.65	-- 1.67 1.18	-- 0.68 0.51	-- 0.28 0.23	-- 0.18 0.16
0.80	-- 2.97 2.18	-- 1.36 1.03	-- 0.60 0.48	-- 0.27 0.23	-- 0.19 0.17

Appendix B.--Continued.

$\rho = 0.90$
$L = 0.00$

INTERVAL= 0.10 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	54.26 7.45 1.14	12.68 1.83 0.31	2.53 0.40 0.08	0.48 0.09 0.03	0.19 0.04 0.02
0.20	25.36 3.66 0.62	7.50 1.14 0.21	1.85 0.31 0.07	0.41 0.08 0.03	0.17 0.04 0.02
0.40	10.10 1.02 0.34	3.69 0.62 0.14	1.15 0.21 0.06	0.31 0.07 0.03	0.14 0.04 0.02
0.60	5.71 1.02 0.26	2.30 0.43 0.12	0.82 0.17 0.06	0.26 0.06 0.03	0.13 0.04 0.02
0.80	3.83 0.76 0.24	1.63 0.34 0.12	0.63 0.14 0.06	0.22 0.06 0.03	0.11 0.04 0.03

INTERVAL= 0.25 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	57.31 7.55 1.14	13.40 1.86 0.31	2.67 0.41 0.08	0.51 0.10 0.03	0.20 0.05 0.02
0.20	26.79 3.71 0.62	7.93 1.16 0.22	1.95 0.32 0.07	0.43 0.09 0.03	0.18 0.04 0.02
0.40	10.68 1.64 0.34	3.90 0.63 0.14	1.22 0.22 0.06	0.33 0.07 0.03	0.15 0.04 0.02
0.60	6.04 1.03 0.26	2.43 0.44 0.12	0.86 0.17 0.06	0.27 0.07 0.03	0.13 0.04 0.02
0.80	4.05 0.77 0.24	1.73 0.34 0.12	0.67 0.15 0.06	0.23 0.06 0.03	0.12 0.04 0.03

INTERVAL= 0.50 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	71.66 7.93 1.16	16.76 1.95 0.32	3.34 0.43 0.09	0.64 0.10 0.03	0.25 0.05 0.02
0.20	33.52 3.90 0.63	9.92 1.22 0.22	2.45 0.33 0.07	0.54 0.09 0.03	0.23 0.05 0.02
0.40	13.38 1.73 0.34	4.89 0.67 0.15	1.53 0.23 0.06	0.42 0.08 0.03	0.20 0.04 0.02
0.60	7.58 1.09 0.27	3.06 0.46 0.13	1.09 0.18 0.06	0.35 0.07 0.03	0.17 0.04 0.03
0.80	5.10 0.81 0.25	2.18 0.37 0.12	0.84 0.16 0.06	0.30 0.07 0.04	0.16 0.04 0.03

INTERVAL= 1.00 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 9.92 1.22	-- 2.45 0.33	-- 0.54 0.09	-- 0.13 0.03	-- 0.07 0.02
0.20	-- 4.89 0.67	-- 1.53 0.23	-- 0.42 0.08	-- 0.12 0.03	-- 0.06 0.02
0.40	-- 2.18 0.37	-- 0.84 0.16	-- 0.30 0.07	-- 0.10 0.03	-- 0.06 0.03
0.60	-- 1.38 0.29	-- 0.59 0.14	-- 0.24 0.07	-- 0.10 0.04	-- 0.06 0.03
0.80	-- 1.05 0.27	-- 0.48 0.13	-- 0.21 0.07	-- 0.09 0.04	-- 0.06 0.04

Appendix B.--Continued.

$\rho = 0.90$
$L = 0.10$

INTERVAL= 0.10 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	55.24 7.82 1.32	12.91 1.92 0.36	2.57 0.42 0.10	0.49 0.10 0.03	0.19 0.05 0.02
0.20	25.82 3.85 0.72	7.64 1.20 0.25	1.88 0.33 0.08	0.41 0.09 0.03	0.17 0.05 0.02
0.40	10.29 1.70 0.39	3.76 0.65 0.17	1.17 0.23 0.07	0.32 0.08 0.03	0.15 0.04 0.02
0.60	5.81 1.07 0.30	2.34 0.45 0.14	0.83 0.18 0.07	0.26 0.07 0.04	0.13 0.04 0.03
0.80	3.90 0.79 0.27	1.66 0.36 0.13	0.64 0.15 0.07	0.22 0.06 0.04	0.12 0.04 0.03

INTERVAL= 0.25 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	58.33 7.92 1.33	13.63 1.95 0.36	2.72 0.43 0.10	0.51 0.10 0.03	0.20 0.05 0.02
0.20	27.27 3.90 0.73	8.07 1.21 0.25	1.99 0.33 0.08	0.44 0.09 0.03	0.18 0.05 0.02
0.40	10.87 1.72 0.40	3.97 0.66 0.17	1.24 0.23 0.07	0.34 0.08 0.03	0.16 0.04 0.03
0.60	6.15 1.08 0.30	2.48 0.46 0.14	0.88 0.18 0.07	0.28 0.07 0.04	0.14 0.04 0.03
0.80	4.13 0.81 0.28	1.76 0.36 0.14	0.68 0.15 0.07	0.23 0.07 0.04	0.12 0.04 0.03

INTERVAL= 0.50 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	72.89 8.31 1.34	17.05 2.05 0.37	3.40 0.45 0.10	0.65 0.11 0.03	0.26 0.05 0.02
0.20	34.10 4.09 0.73	10.10 1.28 0.25	2.49 0.35 0.09	0.55 0.10 0.03	0.23 0.05 0.02
0.40	13.61 1.81 0.40	4.98 0.70 0.17	1.56 0.24 0.07	0.43 0.08 0.03	0.20 0.05 0.03
0.60	7.72 1.14 0.31	3.11 0.49 0.15	1.11 0.19 0.07	0.35 0.07 0.04	0.18 0.05 0.03
0.80	5.19 0.85 0.28	2.22 0.38 0.14	0.86 0.16 0.07	0.30 0.07 0.04	0.16 0.05 0.03

INTERVAL= 1.00 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 10.38 1.41	-- 2.56 0.39	-- 0.57 0.11	-- 0.14 0.04	-- 0.07 0.03
0.20	-- 5.12 0.77	-- 1.60 0.27	-- 0.44 0.09	-- 0.13 0.04	-- 0.07 0.03
0.40	-- 2.28 0.43	-- 0.88 0.18	-- 0.31 0.08	-- 0.11 0.04	-- 0.07 0.03
0.60	-- 1.45 0.33	-- 0.62 0.16	-- 0.25 0.08	-- 0.10 0.04	-- 0.07 0.04
0.80	-- 1.10 0.31	-- 0.50 0.15	-- 0.22 0.08	-- 0.10 0.05	-- 0.07 0.04

Appendix B.--Continued.

$\rho = 0.90$
$L = 0.30$

INTERVAL= 0.10 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	59.46 10.08 2.89	13.90 2.48 0.78	2.77 0.55 0.21	0.52 0.13 0.07	0.21 0.06 0.04
0.20	27.80 4.96 1.57	8.23 1.55 0.54	2.02 0.42 0.17	0.45 0.11 0.06	0.19 0.06 0.04
0.40	11.08 2.20 0.83	4.05 0.84 0.35	1.26 0.29 0.14	0.34 0.10 0.06	0.16 0.05 0.04
0.60	6.26 1.38 0.62	2.52 0.58 0.28	0.89 0.23 0.13	0.28 0.09 0.06	0.14 0.05 0.04
0.80	4.20 1.02 0.53	1.79 0.46 0.25	0.69 0.19 0.12	0.24 0.08 0.06	0.13 0.05 0.04

INTERVAL= 0.25 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	62.65 10.20 2.90	14.65 2.51 0.79	2.92 0.56 0.21	0.55 0.13 0.07	0.22 0.06 0.04
0.20	29.30 5.02 1.57	8.67 1.57 0.54	2.14 0.43 0.17	0.47 0.12 0.06	0.20 0.06 0.04
0.40	11.69 2.22 0.84	4.27 0.86 0.35	1.33 0.30 0.14	0.36 0.10 0.06	0.17 0.06 0.04
0.60	6.61 1.40 0.62	2.67 0.59 0.28	0.95 0.23 0.13	0.30 0.09 0.06	0.15 0.05 0.04
0.80	4.44 1.04 0.53	1.89 0.47 0.25	0.73 0.20 0.12	0.25 0.08 0.06	0.13 0.05 0.04

INTERVAL= 0.50 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	77.72 10.64 2.93	18.19 2.63 0.80	3.64 0.58 0.21	0.69 0.14 0.07	0.28 0.07 0.04
0.20	36.38 5.25 1.59	10.78 1.64 0.55	2.66 0.45 0.18	0.59 0.12 0.06	0.25 0.06 0.04
0.40	14.54 2.33 0.85	5.32 0.90 0.36	1.67 0.31 0.14	0.46 0.11 0.06	0.22 0.06 0.04
0.60	8.25 1.47 0.63	3.33 0.63 0.29	1.19 0.25 0.13	0.38 0.10 0.06	0.19 0.06 0.04
0.80	5.56 1.10 0.55	2.38 0.49 0.26	0.92 0.21 0.13	0.32 0.09 0.06	0.17 0.06 0.05

INTERVAL= 1.00 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 12.97 3.08	-- 3.21 0.84	-- 0.72 0.23	-- 0.18 0.08	-- 0.09 0.05
0.20	-- 6.43 1.68	-- 2.02 0.58	-- 0.56 0.19	-- 0.16 0.07	-- 0.09 0.05
0.40	-- 2.89 0.91	-- 1.12 0.38	-- 0.40 0.16	-- 0.14 0.07	-- 0.08 0.05
0.60	-- 1.85 0.69	-- 0.79 0.32	-- 0.32 0.15	-- 0.13 0.08	-- 0.09 0.06
0.80	-- 1.41 0.61	-- 0.64 0.30	-- 0.28 0.15	-- 0.13 0.08	-- 0.09 0.07

Appendix B.--Continued.

$\rho = 0.90$
$L = 0.70$

INTERVAL= 0.10 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	80.29 23.82 14.81	18.78 5.85 3.83	3.75 1.28 0.92	0.71 0.29 0.24	0.28 0.13 0.12
0.20	37.56 11.70 7.67	11.12 3.63 2.50	2.74 0.98 0.73	0.81 0.26 0.22	0.25 0.13 0.11
0.40	14.99 5.13 3.68	5.48 1.96 1.46	1.71 0.67 0.53	0.47 0.21 0.19	0.21 0.11 0.10
0.60	8.48 3.17 2.45	3.42 1.33 1.06	1.21 0.51 0.43	0.38 0.19 0.17	0.19 0.11 0.10
0.80	5.69 2.32 1.90	2.42 1.03 0.86	0.93 0.43 0.38	0.32 0.17 0.16	0.17 0.10 0.10

INTERVAL= 0.25 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	84.00 24.10 14.91	19.66 5.92 3.86	3.93 1.30 0.93	0.75 0.29 0.24	0.29 0.14 0.12
0.20	39.32 11.84 7.72	11.65 3.68 2.52	2.87 0.99 0.74	0.64 0.26 0.22	0.27 0.13 0.11
0.40	15.71 5.20 3.72	5.75 1.99 1.48	1.79 0.68 0.54	0.49 0.22 0.19	0.23 0.12 0.11
0.60	8.90 3.22 2.48	3.59 1.36 1.08	1.28 0.52 0.44	0.40 0.19 0.17	0.20 0.11 0.10
0.80	5.98 2.36 1.93	2.55 1.05 0.88	0.98 0.44 0.38	0.34 0.17 0.16	0.18 0.10 0.10

INTERVAL= 0.50 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	101.34 25.20 15.29	23.78 6.21 3.97	4.78 1.37 0.96	0.92 0.32 0.25	0.37 0.15 0.13
0.20	47.56 12.42 7.95	14.13 3.87 2.60	3.51 1.05 0.77	0.79 0.28 0.23	0.34 0.14 0.13
0.40	19.11 5.49 3.85	7.01 2.11 1.54	2.21 0.72 0.57	0.61 0.24 0.20	0.29 0.13 0.12
0.60	10.90 3.43 2.60	4.41 1.45 1.13	1.58 0.57 0.47	0.51 0.21 0.19	0.26 0.12 0.12
0.80	7.38 2.53 2.04	3.16 1.13 0.93	1.23 0.48 0.41	0.44 0.20 0.18	0.23 0.12 0.11

INTERVAL= 1.00 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 32.68 17.61	-- 8.18 4.67	-- 1.87 1.18	-- 0.67 0.34	-- 0.24 0.20
0.20	-- 16.37 9.33	-- 5.19 3.12	-- 1.47 0.96	-- 0.43 0.32	-- 0.24 0.20
0.40	-- 7.49 4.72	-- 2.93 1.93	-- 1.05 0.74	-- 0.38 0.30	-- 0.23 0.20
0.60	-- 4.87 3.33	-- 2.10 1.49	-- 0.86 0.65	-- 0.35 0.29	-- 0.23 0.20
0.80	-- 3.75 2.75	-- 1.71 1.29	-- 0.76 0.60	-- 0.35 0.30	-- 0.24 0.22

Appendix B.--Continued.

$\rho = 0.70$
$L = 0.00$

INTERVAL= 0.10 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	63.45 8.71 1.33	14.83 2.14 0.36	2.95 0.47 0.10	0.56 0.11 0.03	0.22 0.05 0.02
0.20	29.66 4.28 0.73	8.77 1.33 0.25	2.16 0.36 0.08	0.48 0.10 0.03	0.20 0.05 0.02
0.40	11.92 1.89 0.40	4.32 0.73 0.17	1.34 0.25 0.07	0.37 0.08 0.03	0.17 0.05 0.03
0.60	6.68 1.19 0.31	2.69 0.50 0.14	0.95 0.20 0.07	0.30 0.08 0.04	0.15 0.05 0.03
0.80	4.47 0.88 0.28	1.91 0.40 0.14	0.73 0.17 0.07	0.25 0.07 0.04	0.13 0.05 0.03

INTERVAL= 0.25 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	67.01 8.82 1.34	15.66 2.17 0.36	3.12 0.48 0.10	0.59 0.11 0.03	0.23 0.05 0.02
0.20	31.33 4.34 0.73	9.27 1.35 0.25	2.28 0.37 0.08	0.50 0.10 0.03	0.21 0.05 0.02
0.40	12.49 1.92 0.40	4.56 0.74 0.17	1.42 0.26 0.07	0.39 0.09 0.03	0.18 0.05 0.03
0.60	7.06 1.20 0.31	2.84 0.51 0.14	1.01 0.20 0.07	0.32 0.08 0.04	0.16 0.05 0.03
0.80	4.74 0.90 0.28	2.02 0.40 0.14	0.78 0.17 0.07	0.27 0.07 0.04	0.14 0.05 0.03

INTERVAL= 0.50 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	83.79 9.27 1.35	19.59 2.28 0.37	3.91 0.50 0.10	0.74 0.12 0.03	0.30 0.06 0.02
0.20	39.19 4.56 0.74	11.60 1.42 0.26	2.86 0.39 0.09	0.64 0.11 0.03	0.27 0.06 0.03
0.40	15.64 2.02 0.40	5.72 0.78 0.17	1.79 0.27 0.07	0.49 0.09 0.04	0.23 0.05 0.03
0.60	8.86 1.27 0.31	3.58 0.54 0.15	1.27 0.21 0.07	0.40 0.08 0.04	0.20 0.05 0.03
0.80	5.96 0.95 0.29	2.55 0.43 0.14	0.99 0.18 0.07	0.35 0.08 0.04	0.18 0.05 0.03

INTERVAL= 1.00 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 11.60 1.42	-- 2.86 0.39	-- 0.64 0.11	-- 0.15 0.04	-- 0.08 0.03
0.20	-- 5.72 0.78	-- 1.79 0.27	-- 0.49 0.09	-- 0.14 0.04	-- 0.07 0.03
0.40	-- 2.55 0.43	-- 0.99 0.18	-- 0.35 0.08	-- 0.12 0.04	-- 0.07 0.03
0.60	-- 1.62 0.34	-- 0.69 0.16	-- 0.28 0.08	-- 0.11 0.04	-- 0.07 0.04
0.80	-- 1.23 0.31	-- 0.56 0.16	-- 0.24 0.08	-- 0.11 0.05	-- 0.08 0.04

Appendix B.--Continued.

$\rho = 0.70$
$L = 0.10$

INTERVAL= 0.10 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	67.30 9.94 1.83	15.73 2.45 0.50	3.13 0.54 0.14	0.59 0.13 0.05	0.23 0.06 0.03
0.20	31.47 4.89 1.00	9.31 1.52 0.34	2.29 0.42 0.12	0.51 0.11 0.05	0.21 0.06 0.03
0.40	12.54 2.16 0.54	4.58 0.83 0.23	1.43 0.29 0.10	0.39 0.10 0.05	0.18 0.05 0.03
0.60	7.09 1.36 0.42	2.86 0.58 0.19	1.01 0.23 0.09	0.32 0.09 0.05	0.16 0.05 0.04
0.80	4.75 1.01 0.38	2.03 0.45 0.18	0.78 0.19 0.09	0.27 0.08 0.05	0.14 0.05 0.04

INTERVAL= 0.25 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	71.07 10.07 1.83	16.62 2.48 0.50	3.31 0.55 0.14	0.63 0.13 0.05	0.25 0.06 0.03
0.20	33.23 4.96 1.00	9.84 1.55 0.35	2.42 0.42 0.12	0.54 0.11 0.05	0.22 0.06 0.03
0.40	13.25 2.20 0.55	4.84 0.85 0.23	1.51 0.29 0.10	0.41 0.10 0.05	0.19 0.06 0.03
0.60	7.50 1.38 0.42	3.02 0.59 0.20	1.07 0.23 0.09	0.34 0.09 0.05	0.17 0.05 0.04
0.80	5.03 1.03 0.38	2.15 0.46 0.19	0.83 0.20 0.09	0.29 0.08 0.05	0.15 0.05 0.04

INTERVAL= 0.50 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	86.82 13.57 1.85	20.78 2.60 0.51	4.15 0.58 0.14	0.79 0.14 0.05	0.31 0.07 0.03
0.20	41.56 5.21 1.01	12.31 1.63 0.35	3.04 0.45 0.12	0.68 0.12 0.05	0.29 0.06 0.03
0.40	16.61 2.31 0.55	6.08 0.89 0.24	1.90 0.31 0.10	0.52 0.13 0.05	0.25 0.06 0.04
0.60	9.42 1.46 0.43	3.80 0.62 0.20	1.36 0.25 0.09	0.43 0.10 0.05	0.22 0.06 0.04
0.80	6.34 1.09 0.39	2.71 0.49 0.19	1.05 0.21 0.10	0.37 0.09 0.05	0.20 0.06 0.04

INTERVAL= 1.00 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 13.22 1.95	-- 3.27 0.53	-- 0.73 0.15	-- 0.18 0.05	-- 0.09 0.04
0.20	-- 6.53 1.07	-- 2.05 0.37	-- 0.57 0.13	-- 0.16 0.05	-- 0.09 0.04
0.40	-- 2.92 0.59	-- 1.13 0.25	-- 0.40 0.11	-- 0.14 0.05	-- 0.08 0.04
0.60	-- 1.86 0.46	-- 0.80 0.22	-- 0.32 0.11	-- 0.13 0.06	-- 0.09 0.05
0.80	-- 1.42 0.43	-- 0.64 0.21	-- 0.28 0.11	-- 0.13 0.07	-- 0.09 0.06

Appendix B.--Continued.

$p = 0.70$
$L = 0.30$

INTERVAL= 0.10 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	78.73 14.74 4.59	18.41 3.63 1.24	3.67 0.80 0.33	0.70 0.19 0.10	0.27 0.09 0.06
0.20	36.82 7.27 2.49	10.90 2.27 0.85	2.68 0.62 0.27	0.59 0.17 0.10	0.25 0.08 0.06
0.40	14.69 3.22 1.32	5.37 1.24 0.55	1.67 0.43 0.22	0.46 0.14 0.09	0.21 0.08 0.06
0.60	8.31 2.02 0.97	3.35 0.86 0.44	1.19 0.34 0.20	0.37 0.13 0.09	0.18 0.08 0.06
0.80	5.58 1.50 0.83	2.38 0.67 0.40	0.92 0.29 0.19	0.32 0.12 0.09	0.17 0.07 0.06

INTERVAL= 0.25 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	83.02 14.93 4.61	19.42 3.68 1.25	3.88 0.82 0.33	0.74 0.19 0.10	0.29 0.09 0.06
0.20	38.85 7.36 2.50	11.51 2.30 0.86	2.84 0.63 0.28	0.63 0.17 0.10	0.26 0.09 0.06
0.40	15.51 3.26 1.33	5.67 1.26 0.55	1.77 0.43 0.22	0.49 0.15 0.09	0.22 0.08 0.06
0.60	8.78 2.05 0.98	3.54 0.87 0.45	1.26 0.34 0.20	0.40 0.13 0.09	0.20 0.08 0.06
0.80	5.90 1.53 0.84	2.52 0.69 0.40	0.97 0.29 0.19	0.34 0.12 0.09	0.18 0.08 0.06

INTERVAL= 0.50 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	103.27 15.66 4.68	24.19 3.87 1.27	4.85 0.86 0.34	0.93 0.20 0.11	0.37 0.10 0.07
0.20	48.39 7.74 2.54	14.35 2.42 0.87	3.55 0.66 0.28	0.80 0.18 0.10	0.34 0.09 0.07
0.40	19.38 3.44 1.36	7.10 1.33 0.57	2.23 0.46 0.23	0.62 0.16 0.10	0.29 0.09 0.07
0.60	11.02 2.17 1.01	4.46 0.92 0.46	1.59 0.37 0.21	0.51 0.14 0.10	0.26 0.09 0.07
0.80	7.44 1.63 0.97	3.19 0.73 0.42	1.24 0.31 0.20	0.44 0.13 0.10	0.23 0.09 0.07

INTERVAL= 1.00 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 19.54 4.99	-- 4.86 1.37	-- 1.13 0.37	-- 0.27 0.13	-- 0.14 0.08
0.20	-- 9.72 2.73	-- 3.06 0.95	-- 0.86 0.31	-- 0.25 0.12	-- 0.14 0.08
0.40	-- 4.39 1.48	-- 1.71 0.63	-- 0.61 0.26	-- 0.22 0.12	-- 0.13 0.09
0.60	-- 2.83 1.13	-- 1.22 0.52	-- 0.49 0.24	-- 0.20 0.13	-- 0.13 0.10
0.80	-- 2.17 1.00	-- 0.99 0.49	-- 0.44 0.24	-- 0.20 0.13	-- 0.14 0.11

Appendix B.--Continued.

$\rho = 0.70$
$L = 0.70$

INTERVAL= 0.10 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	120.09 38.10 23.96	28.11 9.36 6.20	5.61 2.05 1.49	1.07 0.46 0.38	0.42 0.21 0.19
0.20	56.21 18.72 12.40	16.65 5.81 4.04	4.11 1.57 1.18	0.91 0.41 0.35	0.38 0.20 0.18
0.40	22.45 8.20 5.95	8.21 3.14 2.37	2.56 1.07 0.86	0.70 0.34 0.30	0.32 0.18 0.17
0.60	12.71 5.08 3.96	5.13 2.14 1.72	1.82 0.82 0.70	0.57 0.30 0.27	0.28 0.17 0.16
0.80	8.53 3.71 3.06	3.64 1.65 1.39	1.40 0.68 0.60	0.48 0.27 0.25	0.25 0.16 0.15

INTERVAL= 0.25 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	126.51 38.75 24.21	29.63 9.53 6.27	5.93 2.09 1.51	1.13 0.47 0.39	0.45 0.22 0.19
0.20	59.27 19.35 12.55	17.57 5.92 4.09	4.34 1.60 1.20	0.97 0.42 0.36	0.41 0.21 0.19
0.40	23.72 8.37 6.04	8.68 3.21 2.40	2.72 1.09 0.88	0.75 0.35 0.31	0.35 0.19 0.17
0.60	13.45 5.19 4.03	5.43 2.19 1.75	1.93 0.84 0.71	0.61 0.31 0.28	0.30 0.17 0.17
0.80	9.05 3.80 3.13	3.87 1.69 1.43	1.49 0.70 0.62	0.52 0.28 0.26	0.27 0.17 0.16

INTERVAL= 0.50 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	157.44 41.35 25.20	37.01 10.20 6.56	7.46 2.26 1.59	1.45 0.52 0.42	0.58 0.25 0.22
0.20	74.31 20.41 13.12	22.03 6.37 4.30	5.48 1.74 1.28	1.24 0.47 0.39	0.53 0.23 0.21
0.40	29.84 9.04 6.38	10.97 3.48 2.55	3.46 1.20 0.94	0.97 0.40 0.34	0.46 0.22 0.20
0.60	17.07 5.66 4.31	6.92 2.40 1.88	2.49 0.94 0.78	0.80 0.35 0.31	0.41 0.21 0.19
0.80	11.59 4.19 3.39	4.97 1.88 1.55	1.94 0.79 0.68	0.69 0.33 0.30	0.38 0.20 0.19

INTERVAL= 1.00 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 57.85 30.59	-- 14.51 8.13	-- 3.33 2.07	-- 0.84 0.61	-- 0.44 0.35
0.20	-- 29.03 16.27	-- 9.22 5.45	-- 2.62 1.70	-- 0.77 0.57	-- 0.43 0.35
0.40	-- 13.34 8.28	-- 5.23 3.40	-- 1.88 1.32	-- 0.68 0.54	-- 0.42 0.36
0.60	-- 8.69 5.88	-- 3.76 2.64	-- 1.54 1.15	-- 0.64 0.53	-- 0.42 0.37
0.80	-- 6.72 4.88	-- 3.08 2.30	-- 1.37 1.08	-- 0.63 0.53	-- 0.44 0.39

Appendix B.--Continued.

$\rho = 0.50$
$L = 0.00$

INTERVAL= 0.10 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	137.20 14.71 2.25	25.36 3.62 0.61	4.99 0.80 0.17	0.94 0.19 0.06	0.37 0.09 0.04
0.20	50.11 7.24 1.23	14.82 2.25 0.42	3.65 0.61 0.14	0.81 0.17 0.06	0.34 0.09 0.04
0.40	19.96 3.20 0.67	7.29 1.23 0.29	2.27 0.43 0.12	0.62 0.14 0.06	0.29 0.08 0.04
0.60	11.28 2.01 0.52	4.54 0.85 0.24	1.61 0.34 0.12	0.51 0.13 0.06	0.25 0.08 0.05
0.80	7.56 1.50 0.47	3.22 0.67 0.23	1.24 0.29 0.12	0.43 0.12 0.07	0.23 0.08 0.05

INTERVAL= 0.25 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	113.22 14.91 2.26	26.46 3.67 0.62	5.27 0.81 0.17	1.00 0.19 0.06	0.39 0.09 0.04
0.20	52.93 7.34 1.23	15.66 2.29 0.43	3.85 0.62 0.14	0.85 0.17 0.06	0.36 0.09 0.04
0.40	21.10 3.24 0.67	7.71 1.25 0.29	2.40 0.43 0.12	0.66 0.15 0.06	0.30 0.08 0.05
0.60	11.93 2.04 0.52	4.81 0.86 0.24	1.71 0.34 0.12	0.54 0.13 0.06	0.27 0.08 0.05
0.80	8.00 1.52 0.48	3.41 0.68 0.23	1.32 0.29 0.12	0.46 0.13 0.07	0.24 0.08 0.05

INTERVAL= 0.50 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	141.58 15.66 2.29	33.11 3.85 0.62	6.61 0.85 0.17	1.26 0.20 0.06	0.50 0.10 0.04
0.20	66.22 7.71 1.25	19.61 2.40 0.43	4.83 0.66 0.15	1.08 0.18 0.06	0.46 0.09 0.04
0.40	26.43 3.41 0.68	9.67 1.32 0.29	3.02 0.46 0.13	0.83 0.15 0.06	0.39 0.09 0.05
0.60	14.98 2.15 0.53	6.05 0.91 0.25	2.15 0.36 0.12	0.68 0.14 0.07	0.34 0.09 0.05
0.80	10.08 1.61 0.49	4.31 0.72 0.24	1.67 0.31 0.12	0.58 0.13 0.07	0.31 0.09 0.06

INTERVAL= 1.00 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 19.61 2.40	-- 4.83 0.66	-- 1.08 0.18	-- 0.26 0.06	-- 0.13 0.05
0.20	-- 9.67 1.32	-- 3.02 0.46	-- 0.83 0.15	-- 0.23 0.07	-- 0.13 0.05
0.40	-- 4.31 0.72	-- 1.67 0.31	-- 0.58 0.13	-- 0.21 0.07	-- 0.12 0.06
0.60	-- 2.74 0.57	-- 1.17 0.27	-- 0.47 0.13	-- 0.19 0.08	-- 0.13 0.06
0.80	-- 2.07 0.53	-- 0.94 0.26	-- 0.41 0.14	-- 0.19 0.09	-- 0.13 0.07

Appendix B.--Continued.

$\rho = 0.50$
$L = 0.10$

INTERVAL= 0.10 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	119.04 18.29 3.56	27.83 4.50 0.97	5.55 1.00 0.27	1.05 0.23 0.09	0.41 0.11 0.06
0.20	55.66 9.01 1.95	16.47 2.81 0.67	4.05 0.77 0.23	0.90 0.21 0.09	0.38 0.11 0.06
0.40	22.19 3.99 1.06	8.11 1.54 0.45	2.53 0.53 0.19	0.69 0.18 0.09	0.32 0.10 0.06
0.60	12.55 2.51 0.82	5.06 1.06 0.38	1.79 0.42 0.18	0.56 0.16 0.09	0.28 0.10 0.07
0.80	8.42 1.87 0.73	3.59 0.84 0.36	1.38 0.36 0.18	0.48 0.15 0.10	0.25 0.10 0.07

INTERVAL= 0.25 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	125.74 18.54 3.58	29.41 4.57 0.98	5.86 1.01 0.27	1.11 0.24 0.09	0.44 0.11 0.06
0.20	58.81 9.13 1.96	17.41 2.85 0.68	4.29 0.78 0.23	0.95 0.21 0.09	0.40 0.11 0.06
0.40	23.46 4.05 1.07	8.58 1.56 0.46	2.68 0.54 0.19	0.73 0.18 0.09	0.34 0.10 0.07
0.60	13.28 2.55 0.82	5.35 1.08 0.38	1.90 0.43 0.18	0.60 0.16 0.09	0.30 0.10 0.07
0.80	8.91 1.90 0.74	3.80 0.85 0.36	1.47 0.37 0.18	0.51 0.15 0.10	0.27 0.10 0.07

INTERVAL= 0.50 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	157.34 19.49 3.62	36.83 4.80 0.99	7.36 1.07 0.27	1.41 0.25 0.09	0.56 0.12 0.06
0.20	73.65 9.61 1.99	21.83 3.00 0.69	5.39 0.82 0.23	1.20 0.23 0.09	0.51 0.12 0.06
0.40	29.45 4.27 1.09	10.78 1.65 0.46	3.38 0.57 0.20	0.93 0.19 0.09	0.44 0.11 0.07
0.60	16.72 2.69 0.84	6.75 1.15 0.39	2.41 0.45 0.19	0.77 0.18 0.10	0.39 0.11 0.07
0.80	11.27 2.02 0.76	4.82 0.91 0.37	1.87 0.39 0.19	0.66 0.17 0.10	0.35 0.11 0.08

INTERVAL= 1.00 YR					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 24.48 3.83	-- 6.06 1.05	-- 1.36 0.29	-- 0.33 0.10	-- 0.17 0.07
0.20	-- 12.11 2.11	-- 3.80 0.73	-- 1.05 0.25	-- 0.30 0.10	-- 0.16 0.08
0.40	-- 5.43 1.16	-- 2.11 0.50	-- 0.74 0.21	-- 0.26 0.11	-- 0.16 0.08
0.60	-- 3.47 0.91	-- 1.49 0.43	-- 0.60 0.21	-- 0.25 0.12	-- 0.16 0.10
0.80	-- 2.64 0.94	-- 1.20 0.42	-- 0.53 0.22	-- 0.24 0.13	-- 0.17 0.11

Appendix B.--Continued.

$\rho = 0.50$
$L = 0.30$

INTERVAL= 0.10 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	149.57 29.71 9.52	34.99 7.33 2.58	6.98 1.63 0.68	1.33 0.38 0.21	0.52 0.18 0.13
0.20	69.98 14.66 5.17	20.73 4.58 1.77	5.11 1.25 0.57	1.13 0.34 0.20	0.47 0.17 0.13
0.40	27.94 6.50 2.74	10.22 2.50 1.15	3.19 0.87 0.46	0.87 0.29 0.19	0.40 0.16 0.13
0.60	15.81 4.08 2.02	6.38 1.73 0.92	2.26 0.68 0.41	0.71 0.26 0.19	0.35 0.15 0.13
0.80	10.62 3.03 1.72	4.53 1.36 0.82	1.75 0.58 0.39	0.60 0.24 0.19	0.32 0.15 0.13

INTERVAL= 0.25 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	158.11 30.16 9.57	37.01 7.44 2.60	7.39 1.65 0.69	1.41 0.39 0.22	0.56 0.19 0.13
0.20	74.02 14.88 5.20	21.93 4.65 1.78	5.41 1.27 0.58	1.20 0.35 0.21	0.51 0.18 0.13
0.40	29.58 6.61 2.76	10.82 2.55 1.16	3.38 0.88 0.46	0.93 0.30 0.20	0.43 0.16 0.13
0.60	16.77 4.16 2.04	6.77 1.77 0.93	2.41 0.69 0.41	0.76 0.27 0.19	0.38 0.16 0.13
0.80	11.27 3.10 1.74	4.81 1.39 0.83	1.86 0.59 0.39	0.65 0.25 0.19	0.34 0.15 0.13

INTERVAL= 0.50 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	198.41 31.86 9.76	46.52 7.88 2.66	9.33 1.76 0.71	1.80 0.42 0.23	0.72 0.20 0.14
0.20	93.05 15.75 5.31	27.62 4.93 1.82	6.85 1.36 0.60	1.54 0.38 0.22	0.66 0.19 0.14
0.40	37.34 7.03 2.84	13.70 2.72 1.19	4.30 0.95 0.48	1.20 0.32 0.21	0.56 0.18 0.14
0.60	21.27 4.44 2.11	8.61 1.89 0.96	3.08 0.75 0.43	0.99 0.29 0.21	0.50 0.18 0.14
0.80	14.38 3.33 1.92	6.16 1.50 0.87	2.40 0.64 0.42	0.85 0.27 0.21	0.46 0.18 0.15

INTERVAL= 1.00 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	-- 40.88 10.59	-- 10.18 2.91	-- 2.31 0.79	-- 0.57 0.27	-- 0.30 0.18
0.20	-- 20.36 5.82	-- 6.43 2.02	-- 1.80 0.67	-- 0.52 0.26	-- 0.29 0.18
0.40	-- 9.24 3.17	-- 3.61 1.35	-- 1.29 0.56	-- 0.46 0.26	-- 0.28 0.19
0.60	-- 5.97 2.42	-- 2.57 1.12	-- 1.05 0.52	-- 0.43 0.27	-- 0.29 0.21
0.80	-- 4.59 2.15	-- 2.10 1.05	-- 0.93 0.52	-- 0.43 0.29	-- 0.30 0.23

Appendix B.--Continued.

$\rho = 0.50$
$L = 0.70$

INTERVAL= 0.10 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	244.69	57.30	11.45	2.18	0.66
	78.97	19.41	4.26	0.96	0.44
	49.18	12.75	3.07	0.79	0.39
0.20	114.59	33.96	8.38	1.86	0.78
	38.82	12.06	3.26	0.86	0.41
	25.51	8.32	2.44	0.72	0.38
0.40	45.81	16.76	5.23	1.43	0.66
	17.04	6.52	2.22	0.71	0.38
	12.28	4.89	1.78	0.63	0.35
0.60	25.95	10.47	3.72	1.17	0.58
	10.55	4.44	1.71	0.62	0.35
	8.20	3.56	1.45	0.57	0.33
0.80	17.43	7.44	2.86	0.99	0.52
	7.71	3.43	1.42	0.56	0.33
	6.35	2.89	1.25	0.52	0.32

INTERVAL= 0.25 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	260.20	60.99	12.22	2.34	0.92
	80.76	19.87	4.37	1.00	0.46
	49.89	12.96	3.13	0.82	0.41
0.20	121.98	36.19	8.95	2.00	0.84
	39.75	12.37	3.35	0.89	0.43
	25.92	8.47	2.50	0.74	0.39
0.40	48.87	17.90	5.60	1.54	0.72
	17.50	6.71	2.29	0.74	0.39
	12.32	5.00	1.82	0.65	0.37
0.60	27.76	11.21	3.99	1.26	0.63
	10.87	4.58	1.77	0.65	0.37
	8.39	3.65	1.49	0.59	0.35
0.80	18.69	7.99	3.09	1.08	0.57
	7.97	3.55	1.48	0.59	0.35
	6.53	2.98	1.30	0.55	0.34

INTERVAL= 0.50 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	334.58	78.72	15.90	3.10	1.25
	87.81	21.70	4.82	1.12	0.53
	52.61	13.74	3.36	0.90	0.47
0.20	157.45	46.90	11.70	2.66	1.15
	43.40	13.57	3.72	1.01	0.51
	27.48	9.03	2.70	0.83	0.45
0.40	63.60	23.40	7.40	2.08	0.99
	19.29	7.43	2.57	0.85	0.47
	13.44	5.39	2.00	0.73	0.43
0.60	36.45	14.79	5.32	1.72	0.88
	12.11	5.14	2.01	0.76	0.45
	9.12	4.00	1.66	0.68	0.42
0.80	24.79	10.65	4.16	1.49	0.81
	8.99	4.03	1.70	0.70	0.43
	7.20	3.31	1.47	0.64	0.41

INTERVAL= 1.00 YR

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	--	--	--	--	--
	127.39	31.99	7.36	1.86	0.97
	65.36	17.43	4.46	1.33	0.78
0.20	--	--	--	--	--
	63.98	20.34	5.78	1.70	0.95
	34.86	11.71	3.67	1.26	0.77
0.40	--	--	--	--	--
	29.44	11.56	4.16	1.52	0.93
	17.84	7.34	2.87	1.18	0.79
0.60	--	--	--	--	--
	19.22	8.32	3.41	1.42	0.94
	12.73	5.73	2.51	1.16	0.82
0.80	--	--	--	--	--
	14.88	6.82	3.03	1.40	0.97
	10.62	5.02	2.36	1.18	0.87

APPENDIX C

Proportion of fish initially released with two tags which are recaptured with at least one tag remaining during experiments of 1-yr (upper figures), 2-yr (middle figures), or 4-yr duration (lower figures).

$\rho = 1.00$

L = 0.00

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	0.091 0.165 0.275	0.173 0.301 0.466	0.315 0.506 0.692	0.527 0.742 0.865	0.672 0.854 0.918
0.20	0.086 0.150 0.233	0.165 0.275 0.399	0.301 0.466 0.606	0.506 0.692 0.785	0.646 0.805 0.854
0.40	0.079 0.126 0.173	0.150 0.233 0.303	0.275 0.399 0.480	0.466 0.606 0.661	0.599 0.719 0.749
0.60	0.072 0.108 0.134	0.138 0.200 0.240	0.253 0.346 0.393	0.433 0.537 0.569	0.557 0.649 0.666
0.80	0.066 0.093 0.108	0.126 0.173 0.196	0.233 0.303 0.331	0.399 0.480 0.499	0.519 0.589 0.600

L = 0.10

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	0.090 0.163 0.266	0.172 0.298 0.452	0.314 0.501 0.676	0.526 0.737 0.852	0.670 0.850 0.910
0.20	0.086 0.149 0.226	0.164 0.273 0.389	0.300 0.462 0.594	0.504 0.687 0.775	0.644 0.801 0.847
0.40	0.078 0.125 0.169	0.150 0.231 0.297	0.275 0.396 0.472	0.465 0.603 0.655	0.597 0.716 0.744
0.60	0.072 0.107 0.132	0.137 0.198 0.236	0.252 0.344 0.388	0.430 0.534 0.565	0.555 0.646 0.663
0.80	0.066 0.092 0.107	0.126 0.172 0.194	0.232 0.301 0.327	0.398 0.478 0.496	0.518 0.587 0.597

L = 0.30

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	0.089 0.153 0.226	0.169 0.280 0.390	0.308 0.475 0.600	0.517 0.706 0.790	0.660 0.821 0.866
0.20	0.085 0.140 0.195	0.161 0.258 0.340	0.295 0.439 0.534	0.496 0.660 0.725	0.635 0.776 0.810
0.40	0.077 0.119 0.150	0.147 0.219 0.267	0.270 0.378 0.434	0.458 0.581 0.620	0.589 0.696 0.717
0.60	0.071 0.102 0.120	0.135 0.189 0.217	0.248 0.330 0.362	0.423 0.517 0.540	0.548 0.630 0.643
0.80	0.065 0.088 0.099	0.124 0.165 0.181	0.229 0.291 0.310	0.393 0.464 0.478	0.512 0.574 0.582

L = 0.70

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	0.092 0.126 0.154	0.157 0.232 0.275	0.287 0.400 0.451	0.485 0.615 0.650	0.623 0.736 0.755
0.20	0.078 0.116 0.138	0.150 0.215 0.248	0.275 0.373 0.412	0.466 0.579 0.607	0.600 0.699 0.714
0.40	0.072 0.100 0.113	0.137 0.187 0.206	0.253 0.327 0.350	0.431 0.517 0.534	0.559 0.634 0.643
0.60	0.066 0.087 0.095	0.126 0.164 0.175	0.233 0.290 0.303	0.400 0.466 0.476	0.521 0.579 0.585
0.80	0.061 0.077 0.081	0.117 0.145 0.152	0.216 0.259 0.267	0.373 0.423 0.429	0.488 0.532 0.536

Appendix C.--Continued.

$\rho = 0.90$

L = 0.00

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	0.090 0.163 0.273	0.171 0.298 0.461	0.312 0.501 0.685	0.522 0.734 0.856	0.665 0.846 0.909
0.20	0.086 0.149 0.231	0.163 0.273 0.395	0.298 0.461 0.600	0.501 0.685 0.777	0.639 0.797 0.845
0.40	0.078 0.125 0.171	0.149 0.231 0.300	0.273 0.395 0.475	0.461 0.603 0.655	0.593 0.712 0.741
0.60	0.071 0.107 0.133	0.136 0.197 0.237	0.250 0.342 0.389	0.426 0.531 0.564	0.551 0.642 0.660
0.80	0.065 0.092 0.107	0.125 0.171 0.194	0.231 0.300 0.327	0.395 0.475 0.494	0.514 0.583 0.594

L = 0.10

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	0.089 0.159 0.258	0.169 0.291 0.438	0.308 0.490 0.656	0.517 0.721 0.832	0.659 0.833 0.891
0.20	0.085 0.145 0.219	0.161 0.266 0.377	0.295 0.452 0.577	0.496 0.673 0.757	0.634 0.786 0.830
0.40	0.077 0.123 0.164	0.147 0.226 0.299	0.270 0.388 0.460	0.457 0.591 0.640	0.588 0.703 0.730
0.60	0.071 0.104 0.128	0.135 0.194 0.230	0.248 0.336 0.379	0.423 0.524 0.553	0.547 0.634 0.650
0.80	0.065 0.090 0.104	0.124 0.168 0.189	0.229 0.295 0.320	0.392 0.469 0.486	0.510 0.577 0.587

L = 0.30

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	0.086 0.147 0.214	0.164 0.269 0.371	0.299 0.456 0.572	0.503 0.681 0.759	0.642 0.795 0.836
0.20	0.082 0.135 0.185	0.156 0.247 0.324	0.286 0.422 0.510	0.483 0.637 0.697	0.618 0.751 0.783
0.40	0.075 0.114 0.143	0.143 0.211 0.255	0.262 0.365 0.416	0.445 0.562 0.598	0.574 0.675 0.695
0.60	0.068 0.098 0.115	0.131 0.182 0.208	0.241 0.318 0.349	0.412 0.501 0.522	0.534 0.612 0.623
0.80	0.063 0.085 0.095	0.121 0.159 0.174	0.223 0.281 0.299	0.383 0.450 0.463	0.499 0.558 0.565

L = 0.70

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	0.078 0.118 0.144	0.150 0.219 0.258	0.274 0.379 0.425	0.465 0.584 0.617	0.598 0.702 0.720
0.20	0.075 0.110 0.129	0.143 0.203 0.233	0.263 0.354 0.389	0.447 0.551 0.576	0.577 0.667 0.681
0.40	0.069 0.095 0.106	0.131 0.177 0.194	0.242 0.311 0.332	0.414 0.493 0.508	0.537 0.607 0.615
0.60	0.063 0.083 0.090	0.121 0.155 0.166	0.223 0.275 0.288	0.384 0.445 0.454	0.502 0.555 0.560
0.80	0.058 0.073 0.077	0.112 0.139 0.144	0.207 0.247 0.254	0.358 0.404 0.410	0.470 0.511 0.514

Appendix C.--Continued.

$\rho = 0.70$

L = 0.00

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	0.082 0.150 0.251	0.157 0.274 0.424	0.286 0.460 0.629	0.480 0.675 0.787	0.611 0.778 0.835
0.20	0.079 0.137 0.212	0.150 0.251 0.363	0.274 0.424 0.552	0.460 0.629 0.715	0.588 0.733 0.777
0.40	0.072 0.115 0.157	0.137 0.212 0.276	0.251 0.363 0.437	0.424 0.552 0.602	0.545 0.655 0.681
0.60	0.065 0.098 0.122	0.125 0.182 0.218	0.230 0.315 0.357	0.392 0.488 0.518	0.506 0.590 0.606
0.80	0.060 0.084 0.098	0.115 0.157 0.179	0.212 0.276 0.301	0.363 0.437 0.454	0.472 0.536 0.546

L = 0.10

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	0.081 0.143 0.228	0.154 0.262 0.389	0.280 0.441 0.586	0.470 0.651 0.748	0.600 0.754 0.804
0.20	0.077 0.131 0.195	0.147 0.240 0.336	0.268 0.407 0.516	0.451 0.608 0.682	0.577 0.712 0.750
0.40	0.070 0.110 0.146	0.134 0.204 0.258	0.245 0.350 0.413	0.416 0.535 0.578	0.535 0.637 0.661
0.60	0.064 0.094 0.115	0.123 0.175 0.206	0.225 0.304 0.341	0.385 0.475 0.500	0.498 0.576 0.590
0.80	0.059 0.081 0.093	0.113 0.152 0.170	0.208 0.267 0.289	0.357 0.425 0.441	0.464 0.524 0.533

L = 0.30

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	0.076 0.128 0.183	0.146 0.235 0.318	0.267 0.400 0.496	0.449 0.600 0.665	0.575 0.705 0.739
0.20	0.073 0.118 0.159	0.139 0.217 0.280	0.255 0.371 0.443	0.431 0.563 0.612	0.553 0.667 0.693
0.40	0.067 0.100 0.124	0.128 0.185 0.222	0.234 0.321 0.363	0.398 0.498 0.527	0.514 0.600 0.617
0.60	0.061 0.086 0.100	0.117 0.161 0.182	0.216 0.281 0.306	0.369 0.444 0.462	0.479 0.545 0.555
0.80	0.056 0.075 0.083	0.108 0.141 0.153	0.199 0.249 0.264	0.343 0.400 0.411	0.448 0.498 0.504

L = 0.70

M \ F	0.10	0.20	0.40	0.80	1.20
0.10	0.068 0.100 0.121	0.130 0.186 0.217	0.238 0.323 0.360	0.405 0.503 0.528	0.523 0.608 0.622
0.20	0.065 0.093 0.109	0.124 0.173 0.197	0.229 0.303 0.330	0.393 0.475 0.495	0.505 0.579 0.590
0.40	0.060 0.081 0.090	0.114 0.151 0.165	0.211 0.267 0.283	0.362 0.426 0.438	0.471 0.528 0.534
0.60	0.055 0.071 0.076	0.105 0.133 0.142	0.195 0.237 0.247	0.336 0.386 0.393	0.441 0.484 0.488
0.80	0.051 0.063 0.066	0.098 0.119 0.124	0.181 0.213 0.219	0.314 0.352 0.356	0.413 0.447 0.449

Appendix C.--Continued.

$\rho = 0.50$

L = 0.00					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	0.068 0.124 0.206	0.130 0.226 0.349	0.236 0.379 0.519	0.396 0.557 0.648	0.504 0.641 0.688
0.20	0.065 0.113 0.175	0.124 0.206 0.299	0.226 0.349 0.455	0.379 0.519 0.589	0.484 0.604 0.641
0.40	0.059 0.095 0.130	0.113 0.175 0.227	0.206 0.299 0.360	0.349 0.455 0.496	0.449 0.540 0.562
0.60	0.054 0.081 0.101	0.103 0.150 0.180	0.190 0.259 0.294	0.323 0.402 0.427	0.417 0.486 0.500
0.80	0.049 0.070 0.081	0.095 0.130 0.147	0.175 0.227 0.248	0.299 0.360 0.374	0.389 0.442 0.450

L = 0.10					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	0.066 0.116 0.183	0.126 0.212 0.313	0.229 0.358 0.472	0.384 0.530 0.606	0.490 0.615 0.655
0.20	0.063 0.106 0.156	0.120 0.195 0.270	0.219 0.331 0.417	0.369 0.495 0.553	0.472 0.580 0.611
0.40	0.057 0.090 0.118	0.109 0.165 0.208	0.201 0.285 0.334	0.340 0.436 0.470	0.438 0.520 0.539
0.60	0.052 0.077 0.093	0.100 0.142 0.167	0.184 0.248 0.276	0.315 0.387 0.407	0.407 0.470 0.481
0.80	0.048 0.066 0.076	0.092 0.124 0.138	0.170 0.218 0.235	0.292 0.347 0.359	0.380 0.428 0.435

L = 0.30					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	0.062 0.101 0.143	0.117 0.187 0.249	0.215 0.318 0.390	0.362 0.479 0.528	0.464 0.565 0.591
0.20	0.059 0.093 0.124	0.112 0.172 0.219	0.206 0.295 0.350	0.348 0.450 0.487	0.447 0.535 0.555
0.40	0.054 0.080 0.098	0.103 0.148 0.175	0.189 0.256 0.288	0.322 0.399 0.421	0.416 0.483 0.495
0.60	0.049 0.069 0.079	0.094 0.128 0.144	0.174 0.225 0.244	0.298 0.357 0.370	0.388 0.439 0.446
0.80	0.045 0.060 0.066	0.087 0.112 0.122	0.161 0.199 0.211	0.277 0.322 0.330	0.363 0.402 0.406

L = 0.70					
M \ F	0.10	0.20	0.40	0.80	1.20
0.10	0.054 0.078 0.092	0.102 0.145 0.167	0.188 0.252 0.278	0.321 0.393 0.412	0.415 0.478 0.489
0.20	0.051 0.072 0.084	0.098 0.135 0.152	0.181 0.236 0.258	0.309 0.372 0.387	0.401 0.456 0.464
0.40	0.047 0.063 0.070	0.090 0.118 0.128	0.167 0.209 0.221	0.287 0.335 0.344	0.374 0.417 0.422
0.60	0.043 0.055 0.059	0.083 0.104 0.110	0.154 0.186 0.193	0.267 0.304 0.309	0.351 0.383 0.386
0.80	0.040 0.049 0.052	0.077 0.093 0.097	0.143 0.168 0.172	0.250 0.278 0.281	0.329 0.354 0.356